Wisconsin Farmers' Institutes, 1888. Bulletin No. 2 1888

Wisconsin Farmers' Institutes
Madison, WI: Western Farmer Co., Printers and Publishers, 1888

https://digital.library.wisc.edu/1711.dl/WBTWXPQWA5QVF8C

WISCONSIN

FARMERS' INSTITUTES,

1888.

BULLETIN NO. 2.

EDITED BY

W H. MORRISON, Superintendent.

MADISON, WISCONSIN.
1888.

WESTERN FARMER CO., . .
. PRINTERS AND PUBLISHERS, .
. . . . MADISON, WIS.

TABLE OF CONTENTS.

INDEX TO ADVERTISEMENTS.

LAW PROVIDING FOR AGRICULTURAL INSTITUTES.

The people of the State of Wisconsin, represented in senate and assembly, do enact as follows:

SECTION 1. Section 1, chapter 9, laws of 1885, is hereby amended, by omitting from said section the words, "in the months of November, December, January, February, March and April in each year," where they occur in the fifth, sixth and seventh lines thereof, so that said section, when so amended, shall read as follows: Section 1. The Board of Regents, of the State University, is hereby authorized to hold institutes for the instruction of citizens of this state in the various branches of agriculture. Such institutes shall be held at such times, and at such places as said board may direct. The said board shall make such rules and regulations as it may deem proper for organizing and conducting such institutes, and may employ an agent or agents to perform such work in connection therewith, as they deem best. The course of instruction at such institutes, shall be so arranged as to present to those in attendance, the results of the most recent investigations in theoretical and practical agriculture.

SECTION 2. Section 2, chapter 9, laws of 1885, is hereby amended, by striking out the words, "five thousand dollars," where they occur in the fourth line of said section, and inserting in lieu thereof the words, "twelve thousand dollars," so that said section, when so amended, shall read as follows: Section 2. For the purposes mentioned in the preceding section, the said board may use such sum as it may deem proper, not exceeding the sum of twelve thousand dollars in any one year, from the general fund, and such amount is hereby annually appropriated for that purpose.

SECTION 3. This act shall take effect and be in force, from and after its passage and publication.

Approved March 16, 1887.

LETTERS OF TRANSMITTAL.

SHEBOYGAN FALLS, Wis., September 11, 1888.

TO HON. GEO. H. PAUL,

President Board of Regents, University of Wisconsin:

I herewith transmit to you for publication Bulletin No. 2, prepared by W. H. Morrison, Superintendent of Wisconsin Farmers' Institutes. This valuable document contains the addresses and discussions at the closing institute held in the

City of Madison, in March last, and is a sample of the eighty-two institutes held during the past year. In every part of the State they were largely attended and warmly welcomed.

Applications for institutes to be held the coming winter have already been received far beyond our ability to accept. It is plainly manifest that there has been a great advance made in agricultural knowledge since the inauguration of farmers' institutes, in this State, and under the able and judicious management of Superintendent Morrison, all branches of agriculture pursued in Wisconsin have had careful attention.

Evidence of the acceptance of the teaching advanced at the institutes the past two years is shown in the fact that over 1,000 silos have already been built, and large additions to the number will follow the present year. The unanimous testimony of the owners is, that they can keep one-third more stock, and in better condition, on the same number of acres. The introduction of corn as a forage crop, during the past two years, has greatly mitigated, if not entirely removed, the losses hitherto sustained during a protracted drouth.

A growing disposition is manifest among farmers to select better live stock and to feed with more intelligence, so as to secure the greatest growth and largest production at smallest cost of labor.

A higher appreciation of the value and importance of increasing the fertility of the soil, and a wiser understanding as to how to accomplish it, are some of the results of the Farmers' Institutes, greatly aided by work at the Experiment Station, and cordially assisted by many of the most intelligent agriculturists throughout the State. These tangible benefits to the great and growing agricultural industries of the State, give hope and courage to those who have been instrumental in contributing to the success already attained, and will be a powerful incentive to renewed efforts in the future.

Respectfully,

HIRAM SMITH,

Chairman Farm Committee.

MADISON, WIS., November 1, 1888.

HON. HIRAM SMITH,

Chairman Farm Committee Board of Regents, University of Wisconsin:

I have the honor to present to you Bulletin No. 2, Wisconsin Farmers' Institutes. The edition issued of Bulletin No. 1, of which there were 31,000 copies, is nearly exhausted.

The time has come when a farmer, to win success and a competence on the farm, must prepare himself by systematic work. The Farmers' Institute is a traveling school of agriculture, which practically is not only educating the farmers of our State in improved methods, and the practice of advanced and successful farming, but is awakening an interest and pride in our State University, and many of their sons and daughters, catching the fire of this awakening, are availing themselves of its educational advantages.

Respectfully,

W. H. MORRISON,

Superintendent.

PREFACE.

To the Farmers of Wisconsin — During the winter of 1887-8, eighty-one Farmers' Institutes were held in this State. The accompanying report of the closing meeting at Madison, is an epitome of the ideas made specially prominent in this work.

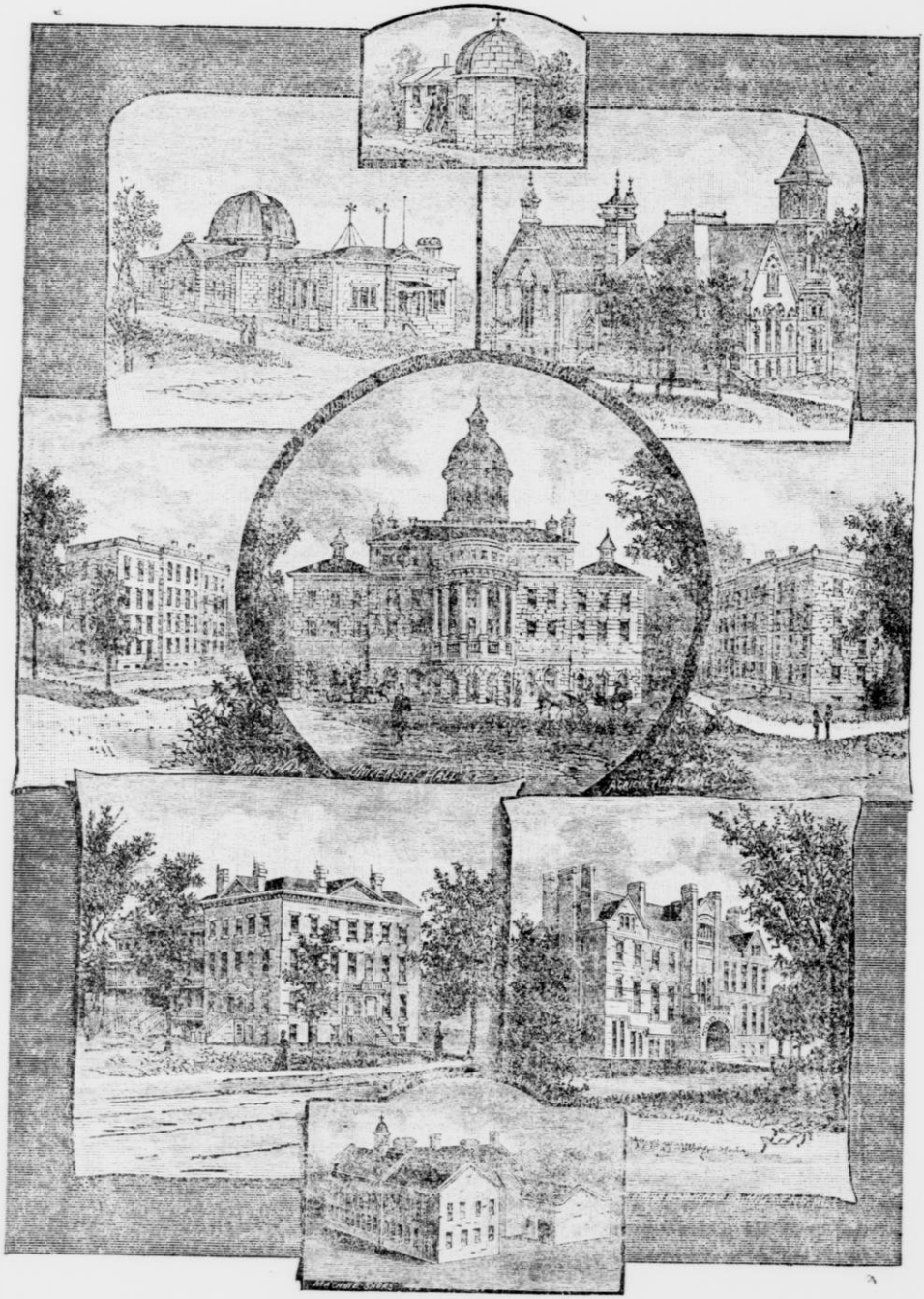
A gratifying feature of last winter's institutes was a more general participation of practical farmers in the discussions. So far as possible, glittering generalities and elocutionary displays were avoided. To inspire and encourage the general farmer, to present the essential truths about farming, and make them clearly understood have been the principal purposes of the institutes.

Organized and carried on to increase the agricultural wealth of the State, they have had a phenomenal success. The money-making and economical methods of the farm have been plainly pictured before tens of thousands. In every neighborhood, and in almost every farm home, these methods and practices have been discussed. They have brought not only material advantages, but mental stimulus; they have had a tendency to make not only workers but thinkers; not only successful farmers, but broad-minded men. Incidentally, they have taught the lessons of good citizenship, duties to children, to neighbors, to other classes, to the State.

The institute work in Wisconsin has obtained a reputation not limited to its own boundaries. I am in receipt of hundreds of letters from every section of the Union asking for the reason of our success. One prime cause, and one apt to be overlooked, has been the fact that the farmers of the State have accepted it with a broad and generous judgment. They have brought into it modesty, practical knowledge, a desire to learn, loyalty to their business, an earnest and charitable spirit of helpfulness toward the institute management. A great work has been done, but the agricultural revolution which is to take place in Wisconsin has only just begun. The knowledge contained in this volume, utilized on every farm in the State, would double the average of every farm product.

The work of the Farmers' Institutes will never be finished until sound judgment and the best knowledge rules every farm, or agriculture ceases to be a progressive art. We ask every farmer who shall read this volume to aid us with his active sympathy and support in making the institutes more effective for good among the farmers of this State.

W. H. MORRISON,
Superintendent.



UNIVERSITY OF WISCONSIN.

Advances of the Past Year.

In our last BULLETIN attention was directed to the fact that the University of Wisconsin had grown faster than the people's knowledge of it, and that a true university of the higher order was developing in our midst more rapidly than had been realized. The growth of the past year has given added truth to this since it has been exceptional not only in the increase of students and in the enlargement of the facilities for instruction, but also in the introduction of new and important features.

The increase in the number of students was fully twenty per cent., and these were distributed through the several departments in such a way as to show a well-balanced growth, and not an exaggerated development in some special line.

The completion of Science Hall — probably the finest building of its kind in this country — has added very greatly to the accommodations afforded for scientific work, and, by relieving the crowded condition of other buildings, has benefited nearly all departments. The purchase of large quantities of the very best modern apparatus and the addition of choice collections in the departments of metallurgy, mineralogy, geology, zoology, etc., together with a careful selection of laboratory manuals, of technical and scientific treatises, and of documents adapted to the work of the newly established *seminars*, have greatly increased the facilities for advanced instruction according to the best modern methods.

There have been added to the ten regular courses of study previously offered, three additional ones, namely, a special course in science antecedent to the study of medicine; a civic-historical course — or rather group of courses — antecedent to the study of law and journalism, and a group of special courses for Normal School graduates.

There has been introduced the German *seminar* system of work, which is intended to vitalize and extend the range of study, and to develop the spirit of original investigation in the historical, linguistic, literary, mathematical and other departments. This system has proved its superior efficiency in Germany, and has been introduced in a few of the foremost institutions in this country. It is believed that it will greatly stimulate and broaden the work in the literary departments, very much as laboratory methods and original research have done in the scientific departments.

There have been established eight University fellowships, and a ninth has been endowed by the liberality of the Hon. John Johnston, of Milwaukee. These fellowships are not to be mistaken for the ordinary under-graduate scholarships, as they are liable to be, since this is the first institution in the interior to establish them. They are open only to

graduates from the regular courses, and provide for an extension of work at the University for two additional years. They will have the practical effect of elevating the range of the University courses to that extent. It is putting an added story on the intellectual edifice. The work will be of a higher order in kind as well as in subject, and will embrace original independent research.

There has been an enlargement of the facilities for independent and original inquiry in various lines, and this important phase of modern education has been industriously fostered. Notable additions to the equipment for such work have been made in astronomy and bacteriology, but the most important have been in the line of agricultural investigation. The equipment of the Experiment Station has been greatly increased. South Hall, which had been previously occupied in part by the agricultural department, has been wholly assigned to it, and has been, in large part, overhauled and refitted, and now furnishes very commodious apartments for it. The laboratory facilities have been fully doubled. New apparatus and a large invoice of important foreign works have been purchased.

A chair of agricultural physics, the first of its kind in this country, has been established, and work in this important department has been inaugurated. The professor occupying this chair will not only engage in original investigation, but will devote special attention to the development of the educational functions of the department, and will give instruction to agricultural students in the physical principles involved in farming operations.

That the growth of the institution is not tending unduly toward the professions and sciences is shown by the development during the year of courses in four additional languages as well as by the introduction of the *seminar* system and the post-graduate courses above alluded to.

Of like import is the establishment of a chair of experimental and comparative psychology — one of the very few in existence — through which an effort will be made to place the supremely important department of mental science in the foremost rank, and to introduce into this field, which has heretofore been so largely occupied with philosophy and speculation, the solid elements of experimentally determined science.

Some important changes have been made in the previously established courses, giving them greater elasticity and affording facilities for consecutive thoroughgoing study in selected lines. There has also been an enlargement of the number of elective studies, so that it is now possible for a student to modify any of the courses to suit his own mental characteristics and preferences to a very important extent. By taking advantage of elective studies there are really open to students an almost indefinite number of courses.

There has been an extension of the system of degrees corresponding to the extension of the University work, and the instructional force has been strengthened.

Some new regulations have been adopted regarding admission to the University, including a system of special local examinations. The standard of admission to the regular college classes, while not changed nominally, has in reality been raised.

THE PROFESSIONAL COURSES.

THE LONG COURSE IN AGRICULTURE.—For some years past the University has offered an extended course in agricultural science, embracing, also, long courses in the closely related sciences. If the opportunities thus afforded had been embraced and industriously followed up, it would have proved a most wise choice to a score or more of talented young farmers' sons. There is just now, probably, a greater demand for thoroughly educated talent in agricultural science than in any other branch of learning. The rapid development of agricultural experiment stations throughout the country creates an exceptional call for ability and skill in that line, and if a few dozen Wisconsin boys who had the native talent had embraced the opportunity, they might now be putting shekels in their pockets and doing the world good and their State honor, at the same time. This course has been reconstructed during the past year, and is now offered with increased and constantly increasing facilities. How long shall it wait for due appreciation?

THE SHORT COURSE IN AGRICULTURE.—To meet an entirely different educational need, a *Short Course in Agriculture* is offered, designed to give, in the briefest time and at the smallest expense, the most available agricultural information. A special statement respecting the course may be found elsewhere in this bulletin.

POPULAR EDUCATION.—But the University is not content to simply rehearse old agricultural doctrines. Its chief effort is to develop new agricultural science and to disseminate it. This it endeavors to do in the most direct and practical way; first, by careful experiments and exact analyses to determine the precise truth, and secondly, by conveying this directly to the farmers by publications and by Farmers' Institutes, so that the *farmers themselves* are coming into direct relationship to the University. It might be too much to say that they are becoming non-resident students of the University, but it may at least be said that they receive information and instruction directly from it. The work of the Experiment Station is best shown by its fruits, and the most of those who read this will, doubtless, also read its reports and know for themselves. As to the work of the Farmers' Institutes this BULLETIN is a witness. In many respects the Farmers' Institutes constitute the most important educational movement of the past decade. That which is taught in them is practical, stimulating, vitalizing, and is probably productive of more thought, observation, inquiry, experimentation and reflection than an equal amount of instruction in any regular educational institution; and, while the amount is limited, the very large numbers in attendance make the total result very great. An institution which directly reaches 50,000 interested truth-seekers is something phenomenal.

LAW COURSE.—The location of the Law Department gives it exceptional advantages. Provided with rooms in the capitol, it is right in the midst of courts, legislative halls and executive offices, right among law-makers, lawyers and judges. Besides its own library the state law library (20,000 vols.), and the great historical library (116,000 vols.), are immediately at hand. Under these conditions the Law Department has had a rapid growth and is attaining a wide reputation.

THE CIVIL ENGINEERING COURSE.— A full four years' course, embracing practical field-work, is offered and shorter special courses are permitted. The facilities are of the first order and are continually being improved.

THE MECHANICAL ENGINEERING COURSE.— The University endeavors to meet the growing demand for mechanical knowledge and skill of the higher order, both theoretical and practical, by furnishing a full four years' course in mechanical science, embracing extended courses in drawing, shop practice and practical testing. It has been found difficult to enlarge the facilities for shop practice fast enough to meet the demand for this popular element of modern education coming, as it does, from students in all the courses.

THE MINING ENGINEERING AND THE METALLURGY COURSES.— A four years' course is offered in mining engineering and also in metallurgy and assaying. These courses have suffered for want of facilities since the burning of old Science Hall, but the new buildings more than compensate for this, and a growth in these departments commensurate with the recent development of mining interests is anticipated.

THE PHARMACY COURSE.— An excellent course in Pharmacy, embracing practical laboratory work, is presented and is well patronized.

CULTURE COURSES.

THE ANCIENT CLASSICAL COURSE.—This course has demonstrated its merits through the experience of the ages and has so many warm friends and stalwart advocates that it needs no commendation here. It is a course in which Greek, Latin and mathematics form the chief agents of culture.

THE MODERN CLASSICAL COURSE.—In this, German, French and other modern languages are substituted for Greek, and thereby the gates are open to the intellectual treasures stored in the European languages, and the means of intercourse with the great peoples of the Continent afforded.

THE ENGLISH COURSE.—This is a comparatively new course, in which, while foreign and ancient languages are offered, the chief emphasis is laid upon our own tongue, the richness and disciplinary powers of which are often overlooked in our admiration of other great languages.

In all these courses mathematics holds a high place, and considerable attention is given to the various physical sciences. Through the electives offered the ratio of these may be largely increased.

THE GENERAL SCIENCE COURSE.—In this the leading place is taken by the natural sciences, embracing chemistry, natural philosophy, physiology, biology, zoology, botany, astronomy, mineralogy, geology and kindred branches, the value of which needs no advocacy in these days of extraordinary utilization of science. With these are also offered extended courses in higher mathematics and the modern languages, especially German and French.

The foregoing are general culture courses intended to give a broad and liberal education while differing somewhat in their chief tendencies. All afford a wide range of study, rich in knowledge and discipline. The three following courses have been introduced during the past year with a view to adapting this general culture to professional courses in medicine, law, journalism and teaching:

THE PRE-MEDICAL COURSE.—In response to a request from the Wisconsin State Medical Society, the University offers a special course in science adapted to those comtemplating the study of medicine and surgery. It embraces long thorough courses in chemistry, physics. anatomy, histology, zoology, botany and kindred branches, which are intended to give a broad and solid foundation for the professional medical course, while at the same time they give a due measure of collegiate culture.

THE PRE-LEGAL AND PRE-JOURNALISTIC COURSES.—For the accommodation of those contemplating the study of law or journalism, extended courses in civil polity, economics and historical science, together with literary and philosophical branches, have been arranged so as to constitute the work of the Junior and Senior years of the collegiate course. Students are thus enabled to profit by an adaptation of their college course to their future work without essential deviation from the general purposes of collegiate training.

SPECIAL COURSES FOR NORMAL SCHOOL GRADUATES.—To afford graduates of the State Normal Schools facilities for extending their studies advantageously, and at the same time to attain a recognized standing leading to a degree, without loss of time or inconvenience arising from the want of adjustment of their previous studies to the standard college courses, special courses have been adopted by the University by which two additional years of successful study will enable graduates from the advanced Normal courses to graduate from the University with a degree.

GENERAL FACILITIES.—The Faculty embraces upwards of fifty instructors. The laboratories are new, extensive and well equipped, embracing the chemical, physical, metallurgical, mineralogical, geological, zoological, botanical, civil and mechanical engineering, agricultural and pharmaceutical laboratories. *Seminars* for advanced study in history, language, literature, mathematics, and other branches are being developed.

The libraries accessible to students embrace that of the University, 16,000 volumes; of the State Historical Society, 123,000 volumes; of the State Law Department, 20,000 volumes; of the City, 9,000 volumes, besides special professional and technical libraries, thus affording very exceptional opportunities for reading and special research.

TERMS OF ADMISSION.

All courses of the University are open to ladies on precisely the same terms as gentlemen.

(1) GENERAL EXAMINATION FOR ALL CANDIDATES FOR THE FRESHMAN CLASS: Orthography, grammar, sentential analysis, arithmetic, algebra through quadratics, plane geometry, civil and physical geography, U. S. history.

(2) FOR THE ANCIENT CLASSICAL COURSE, the above (1), and ancient and English history; Latin grammar and composition, Cæsar (four books), Cicero (six orations), Virgil (six books), Sallust's Conspiracy of Catiline; Greek grammar and composition, Xenophon's Anabasis (three books), Homer's Iliad (two books).

(3) FOR THE MODERN CLASSICAL COURSE, all the above (1) and (2) except Greek, instead of which German grammar and twenty lessons in any standard German reader, and solid geometry are required.

(4) FOR THE ENGLISH COURSE, the general examination required of all (1), and English literature, ancient and English history, botany, physiology, natural philosophy and solid geometry.

(5) FOR THE GENERAL SCIENCE, SPECIAL SCIENCE (pre- medical), LONG AGRICULTURAL and all ENGINEERING COURSES, the general examination required of all (1), and German grammar, twenty lessons in the German reader, botany, physiology, natural philosophy and solid geometry.

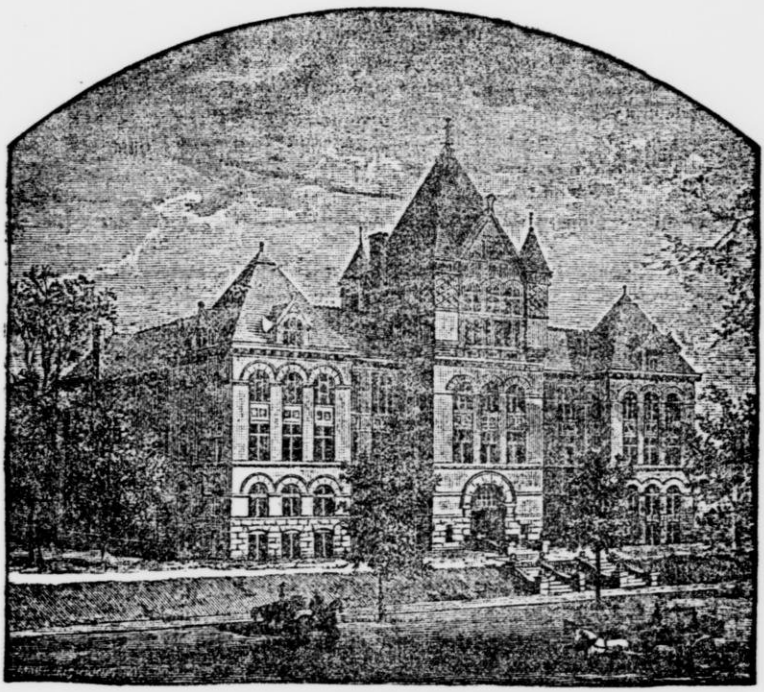
(6) FOR THE CIVIC-HISTORIC COURSE, the same as for the English or classical Courses.

(7) FOR THE ELEMENTARY GREEK CLASS (Greek not required), Latin grammar and composition, Cæsar (four books), Cicero (two orations), Sallust's Conspiracy of Cataline, ancient and English history, and the general examination required of all (1).

(8) FOR SPECIAL STUDENTS, the English branches required for the General Science Course including the general examination (1).

(9) FOR LAW AND PHARMACY, evidence of sufficient education to profitably pursue the courses.

Readers desiring specific details will find the President, Secretary and Registrar ready to give any required information, either of whom may be addressed by title simply.



NEW SCIENCE HALL.

THE SHORT COURSE IN AGRICULTURE.

The University of Wisconsin has provided a special course in Agriculture, to accommodate those young men who desire to gain a better knowledge of the science underlying successful agriculture but who can give only a limited time to such preparation. For the accommodation of such students the term opens January 2, 1889, and lasts twelve weeks.

The facilities now provided to make this an intensely practical and profitable course for young farmers are greatly superior to those offered in previous years.

A reading room and library have been provided in which students will find the standard works on agriculture and files of seventy of the leading agricultural periodicals, nine of which are from Europe. The lecture room will be provided with an electric light so that lantern slides illustrating the lecture may be used.

The famous *Auzoux* life-size model of the horse, which can be dissected to show the separate muscles, nerves, blood vessels and bones, will be used to illustrate the lectures on anatomy.

There will be a laboratory for the use of students in the study of agricultural physics.

Through an increase in the corps of instructors and more ample accommodations than heretofore, it has been found possible to so expand the course as to offer the student work ample for two terms, from which he may elect such subjects as, in his judgment, may seem best for the time, and still have fresh work to which he may return another year should he so desire.

The course embraces the following:

Sixty lectures, mainly devoted to the feeding and breeding of live stock, by Prof. W. A. Henry.

Sixty lectures on the elements of agricultural chemistry, by Dr. S. M. Babcock.

Twenty-four lectures on agricultural botany, together with 108 hours of laboratory work on the common farm plants, by Prof. C. R. Barnes.

A course in shop-practice involving the use of wood-working tools and the forging of iron, by Supt. C. I. King.

Thirty-six lectures on the anatomy of domestic animals, by Dr. V. T. Atkinson, State Veterinarian.

Forty laboratory exercises, during which the student will experimentally demonstrate some of the leading physical principles underlying the cultivation of soil, drainage, stock-raising, farm machinery and questions of sanitation, under Prof. F. H. King.

Twelve lectures on the physical features, climate and meteorology of Wisconsin and of the United States, by Prof. F. H. King.

The expenses of the term need not exceed $55.00 for incidental fees, books, board, room and washing.

This course opens January 2, 1889, and lasts twelve weeks.

No examinations will be required, but applicants must be not less than sixteen years of age and have a common school education.

For farther particulars, address PROF. W. A. HENRY,
Madison, Wis.

STATE INDUSTRIAL ASSOCIATIONS.

OFFICERS FOR THE YEAR 1888.

Wisconsin Experiment Station.

T. C. CHAMBERLIN, - - - - - - - - - - - - PRESIDENT.
W. A. HENRY, - - - - - - - - - - - - - - DIRECTOR.
S. M. BABCOCK, - - - - - - - - - - - - CHIEF CHEMIST.
F. H. KING, - - - - - - - - - - - - - - PHYSICIST.
F. G. SHORT, - - - - - - - - - - - - ASSISTANT CHEMIST.
F. W. A. WOLL, - - - - - - - - - - 2D ASSISTANT CHEMIST.
L. H. ADAMS, - - - - - - - - - - - - FARM SUPERINTENDENT.
MISS N. M. NOTT, - - - - - - - - CLERK AND STENOGRAPHER.

Office and Laboratories, in Agricultural Hall, University Grounds.
Experiment Farm with buildings joins the college grounds on the west.
Telephone connections.

Wisconsin State Agricultural Society.

President, - - - - - - - - - - - JOHN L. MITCHELL, Milwaukee.
Secretary, - - - - - - - - - - - T. L. NEWTON, Beaver Dam.

Wisconsin Dairymen's Association.

President, - - - - - - - - - - - H. C. ADAMS, Madison.
Secretary, - - - - - - - - - - - D. W. CURTIS, Ft. Atkinson.

Wisconsin Shorthorn Breeders' Association.

President, - - - - - - - - - - - GEO. HARDING, Waukesha.
Secretary, - - - - - - - - - - - - JOHN M. TRUE, Baraboo.

Wisconsin Jersey Breeders' Association.

President, - - - - - - - - - - - - N. N. PALMER, Brodhead.
Secretary, - - - - - - - - - - - - T. L. HACKER, Madison.

Wisconsin State Horticultural Society.

President, - - - - - - - - - - - - J. M. SMITH, Green Bay.
Secretary, - - - - - - - - - - - - B. S. HOXIE, Evansville.

Wisconsin Swine Breeders' Association.

President, - - - - - - - - - - - - - GEO. WYLIE, Leeds.
Secretary, - - - - - - - - - - - GEO. MCKERROW, Sussex.

Wisconsin Poultry Association.

President, - - - - - - - - - - - H. L. HUMPHREY, Hudson.
Secretary, - - - - - - - - - DR. E. L. BOOTHBY, Hammond.

Wisconsin State Bee-Keepers' Association.

President, - - - - - - - - - - - - - C. A. HATCH, Ithaca.
Secretary, - - - - - - - - - - FRANK WILCOX, Mauston.

Wisconsin Sheep Breeders' and Wool Growers' Association.

President, - - - - - - - - - - W. L. PARKER, Beaver Dam.
Secretary, - - - - - - - - - H. J. WILKINSON, Whitewater.

S. E. Wisconsin Sheep Breeders' and Wool Growers' Association.

President, - - - - - - - - - - - DELBERT UTTER, Caldwell.
Secretary, - - - - - - - - - . - - A. H. CRAIG, Caldwell.

BREEDERS' DIRECTORY.

An invitation was extended through the press of the State, to all breeders of pure bred stock, to send their name, kind of stock, and post office, to this office for compilation. The following availed themselves of the offer. SUPERINTENDENT.

Percheron Horses.

Astle, George	Prairie du Sac.
Bowles & Hadden	Janesville.
Burrington Bros	Sun Prairie.
Brown, L. & M. A	Delavan.
Brown, Henry	Augusta.
Blackford, J. W	Juda.
Blackman, Henry	Kenosha.
Brereton, T. D	Springfield Corner.
Brereton, Geo. R	Mazomanie.
Coolidge, S. E	Augusta.
Case, H. J	Baraboo.
Crane, W. W	Weyauwega.
Colbeck & Wethen	Darlington.
Chandler & Fox	Oregon.
Coon, H. C	Albion.
Duffy & Pierce	Darlington.
Dohrman, Aug	Mayville.
Ellis, John	Moundville.
Fleming, G. W	Amherst.
Faucette, Thos	Darlington.
Galbraith Bros	Janesville.
Golden, Frank	Cartwright.
Gilman, J. A	Sparta.
Harvey, Charles	Mondovi.
Harvey, James	Mondovi.
Hannar, J. J	Depere.
Holt, D. B	Danville.
Hoover, I. L	Clinton.
Hopewood, E	Merritts Landing.
Hickey, J. E., & Sons	Whitewater.
Hill, H. D., & Son	Lake Geneva.
Holt, C. D	Ranney.
Johnson, Chris	Chetek.
Johnson, David	Jefferson.
Kellogg, Rufus B	Green Bay.
Kay, Andrew	Depere.
Loomer, J. H	Douglas Center.
Lawrence, A. H	Sturgeon Bay.
Lytle, Geo. A	Elkhorn.
McMellen, A	Douglas Center.
Marsh, G. S	Depere.
Murry, John	Fifield.
Morley, N. W	Baraboo.
Morgan, James	Darlington.
McKay, D. G	Chippewa Falls.
Macomber, S. D	New Lisbon.
McWilliams Bros	Oregon.
Mills, Walter	Douglas Center.
Morley, J. W	Ableman.
Myers, H. J	Chetek.
Nihlem Bros	Truesdell.
Odell, J	Bessemer.
Rice, B	Amherst.
Skinner, Thos	Merritts Landing.
Shockley & Andrews	Darlington.
Slaven, John	Reedsburg.
Smith, N. H	Baraboo.
Smith, John M	Eau Claire.
True, John M	Baraboo.
Truax, Peter	Eau Claire.
Turliff, Thos	West Depere.
Wood, James	Fremont.
Wishard, Thos	Depere.
Wiese, Fred	West Depere.
Whelan, J. W	Mondovi.

Clydesdale Horses.

Arries Bros	Augusta.
Briggs, H. A	Elkhorn.
Brown, L. & M. A	Delavan.
Bowles & Hadden	Janesville.
Brown, Henry	Augusta.
Barber, Solon	Augusta.
Brereton, Geo. R	Mazomanie.
Burrington, Bros	Sun Prairie.
Bennett, John	Westfield.
Boyce, Reuben	Brooklyn.
Beattie, Wm	Arlington.
Ellsworth, John M	Dodgeville.
French, H	Galesville.
Galbraith Bros	Janesville.
Hoover, I. L	Clinton.
Hamilton, Hugh	Westfield.
Jones, Robert O	Cambria.
Jones, Richard	Cambria.
Kennedy, Daniel	Galesville.
Lowell, R. D	Sharon.
Lyale, James	Verona.

Clydesdale Horses—Continued.

Miller, William	Rusk.
Norton Bros	Byron.
Ogilvie, R. B	Madison.
Ogilvie, Wm	Verona.
Plenty, John	Poynette.
Perry, Eli	Waupun.
Quick, W. J	Lamartine.
Rhoda, Edson	Centerville.
Richards, Griffith	Cambria.
Russell, Samuel	Westfield.
Root, Philo	Hortonville.
Sprecher, John	Madison.
Stroup, Geo	Lamartine.
Stroup, Uriah	Fond du Lac.
Stocking, John	Eau Claire.
Valerius & Co	Watertown.
White, Chas	Fulton.
Wenziaff, Chas	Seymour.

Cleveland Bay Horses.

Fox, A. O	Oregon.
Pabst, Fred	Milwaukee.
Urhlein Bros	Milwaukee.
Warren, Geo., & Sons	Fox Lake.
Webster Bros	Danville.

Standard Bred Trotting Horses.

Brooks, Seymour	East Troy.
Blake, Dr	Lodi.
Case, J. I	Racine.
Clark, C. M	Whitewater.
Fox, A. O	Oregon.
Hazen, Chester	Brandon.
Kilbourn, J. M	Lancaster
McKinney, H. D	Janesville.
Moore, A. C	Fond du Lac.

Shetland Ponies.

Lilburn, Robert	Emerald Grove.

Shorthorn Cattle.

Arnold, A. A	Galesville.
Arries, Robert	Lodi.
Andrus, M. L	Chetek.
Babbitt, Clinton	Beloit.
Bartlett, W. B., & Sons	Eagle Point.
Bickel Bros	Amherst.
Beckler, I. P	Sparta.
Bennett, J. B	Dallas.
Ballentine, James	Bloomington.
Ballentine, David	Bloomington.
Brooks, Seymour	East Troy.
Bryant, Geo. E	Madison.
Brinkerhoff, F	Brandon.
Boyce, Reuben	Brooklyn.
Carver, N. E	Chetek.
Case, H. J	Baraboo.
Campbell, Samuel	Westfield.
Cockeram, Osmond	Menomonie.
Crawford, John	Menomonie.
Cobden, J	Lodi.
Cole, John A	Hustisford.
Collard, Chas	Edmund.
Clark, C. M	Whitewater.
Clark, Isaac	Galesville.
Doane, C. A	Sparta.
Dillon, Thos. H	Mondovi.
Finnegan, P	Stitzer.
Finnegan, P. H	Fennimore.
Farnum, H. J	Prairie du Sac.
Fisher, Seth	Center.
Fitch, F. B	Darlington.
Falkenstein, L	Lodi.
Fish, L. N	Reedsburg.
Forbes, W. H	River Falls.
Golden, Frank	Cartwright.
Green, Myron F	Fulton.
Gough, John	Saukville.
Hartley, Mrs. Mary	La Crosse.
Hubbard, S. D	Mondovi.
Harrington, Dr. C. L	Madison.
Henthorn, Wm	Sylvan.
Hillman, D	Brandon.
Hyatt, A. X	Sheboygan Falls.
Holt, D. B	Danville.
Hopkins, James	Leyden.
Hazen, Chester	Brandon.
Harding, George	Waukesha.
Harden, Wm	Rural.
Hannum, Geo. M	Lancaster.
Jacobs, W. H	Madison.
James, N. L	Richland Center.
Jackson, Allen	Phillips.
Kennedy, Daniel	Galesville.
Kiser, J. C	Oregon.
Kent, W. A	Dallas.
Kay, Robert	Depere.
Lyall, James	Verona.
Lamberton, J. C	Whitehall.
Leiby, John	Greenville.
Lewis, William	Bloomington.
Lewis, Geo. A	Fond du Lac.
Lovering, Albert	Lodi.
Ludlow, A., & Son	Monroe.
Long, Samuel	Westfield.
Maliory, L. D	Westfield.
Mahaffy, James	Montello.
Morley, R. A	Baraboo.
March, John	Shullsburg.
Moss, P. H	Sparta.
McIntosh, C. H	Lodi.
McKibben, J. C	Poynette.
Mathews, John	Darlington.
Mathy, Henry	Depere.

Shorthorn Cattle—Continued.

Mallory, John ..... Wayside.
Morkin, P ..... Bloomington.

Norrish, Edward ..... Rock Falls.
Nathan, Joseph ..... Lancaster.
Nash, L. M ..... Centralia.

Ogilvie, R. B ..... Madison.
Owen, D., & Son ..... Portage.
Owens, J. E ..... Brooklyn.

Pound, Thad C ..... Chippewa Falls.
Porter, John ..... Whitehall.

Roberts, R. O ..... Cambria.
Richards, Griffith ..... Cambria.
Rhodes, Edson ..... Galesville.
Rezin, Daniel ..... Rudolph.
Richardson, W. P ..... Lancaster.
Ross, John, & Son ..... Mineral Point.
Rewey, J. W ..... Rewey.

Smith Bros ..... Rochester.
Stetson Bros ..... Oshkosh.
Sprecher, John ..... Madison.
Sherman, H. B .....
Scott, Kennedy ..... Rio.
Scoville, J. M ..... Lowville.
Scott, Charles ..... Augusta.
Sanger, C. M., & Son ..... Waukesha.
Sanderson, Thos ..... Leeds.
Sanderson, Joseph ..... Cambria.
Stephenson, Geo ..... Darlington.
Seymour, S. J ..... Reedsburg.
Smith, James ..... Depere.
Stroup, Uriah ..... Fond du Lac.
Snyder, John ..... Elkhorn.

Turriff, James ..... West Depere.
Tormley, Thos ..... Fennimore.
Tizer, Samuel ..... Sparta.
Turner, Edward ..... Amherst.

Van Vonderon, John ..... Depere.
Van Matre, T. J ..... Fayette.
Van Matre, Joseph ..... Mineral Point.

Warren, Geo., & Son ..... Fox Lake.
Wylie, Geo ..... Leeds.
Webster Bros ..... Danville.
Wilson, T ..... Packwaukee.
Willis, Richard ..... Lancaster.
Wilson, W. W ..... Lodi.
Wrinkley, D ..... Clinton.
White, Alexander ..... Fulton.

Jersey Cattle.

Adams, H. C ..... Madison.
Armitage, S. P ..... Seymour.
Allen, S. S ..... Darlington.
Allen, J. B., & Son ..... Delavan.

Bartlett, W. B., & Sons ..... Eagle Point.
Bradley, W. C ..... Hudson.
Bradley, C. W ..... Hudson.
Bryant, Geo. E ..... Madison.
Butten, Thos ..... Darlington.
Bartley, P ..... Bloomington.
Brigulette, J. W ..... Green Bay.
Burrowbridge, Jas ..... Madison.

Clegg, John ..... Bloomington.
Convey Thos ..... Ridgeway.
Cripps, Dell ..... Independence.
Culberston, H. M ..... Greenville.
Church, C. & M. H ..... Walworth.
Cochrane, Thos ..... Eau Claire.
Coolidge, S. E ..... Augusta,
Crapp, John ..... Tomah.
Cuppel, Chas ..... Milwaukee.

Dettinger, John ..... Galesville.
Dennerson, Jacob ..... Augusta.
Dailey, J. G ..... Hudson.
Doyon, M. R ..... Madison.
Durand, H. G ..... Racine.
Driver, James ..... Darlington.
Dey, John ..... Hortonville.

Erickson, M. J ..... Sheboygan Falls.
Ettinger, L. H ..... Lowell.
Earle, T. H ..... Darlington.

Fox, William ..... Baraboo.
Farnum, H. D ..... Merrimack.
Farnum, L ..... Stephensville.
Frey, Philip ..... W. Union Junction.
Farnham, Mr ..... Shiocton.
Fish, H. Z ..... Muscoda.

Gay, Wm. M ..... Madison.
Galloway, E. A ..... Fond du Lac.
Gibbs, C. R ..... Whitewater.
Griffith, C. N ..... Whitewater.
George, F. A ..... Whitehall.
Grover, P. & E ..... Amherst.
Greer, M. L ..... Elroy.

Hacker, T. L ..... Madison.
Hinkley, A. R ..... Eagle.
Hinkley, F. D ..... Mil., 200 Grand Ave.
Harnden, Henry ..... Madison.
Hitt, D. H ..... Oakfield.

Jackson, Allen ..... Phillips.
Jennings, W. H ..... Tomah.

Kellogg, H. B ..... Ranney.
Kingman, R. S ..... Sparta.
King, Edmund ..... Whitewater.

Lutz Bros ..... Grand Rapids.
Lawrence, A. W ..... Sturgeon Bay.
Lytle, Geo. A ..... Elkhorn.
Lybrand, R. C ..... Richland Center.
Lilly, Frank ..... Darlington.
Lowe, Victor ..... Palmyra.
Lawton, J. G ..... Depere.

Moon, D. R ..... Eau Claire.
Muzzy, John ..... Angusta.
Miller, C. B., & Co ..... Madison.
Morey, James ..... Merrimack.
Mole, James ..... Janesville.
Memger, R ..... West Depere.
Merrill, H. L ..... Portage.
Martin, John C ..... Mineral Point.
Merriman ..... Ft. Atkinson.
Masse, O. W ..... Louisville.
Mayo, W. B ..... Thiensville,
Myers, H. J ..... Cartwright.

Nuzum, G. W ..... Viroqua.
Northrap, S. S ..... Clinton.

Outhouse, Wm. H ..... Madison.

Palmer, N. N ..... Brodhead.
Pound, Thad. C ..... Chippewa Falls.
Pickard, J. W ..... Richland Center.

Jersey Cattle—Continued.

Pardee, A. J. ..... Eagle.
Pierce, C. W. ..... Sheboygan Falls.

Rowe, A. L. ..... Scandinavia.
Rawson, G. H. ..... Oak Center.
Richardson, A. D. ..... Hudson.
Repine, Samuel ..... Elk Mound.

Snyder, A. L. ..... Mt. Hope..
Stewart, Robert ..... Chetek.
Smith, L. C. ..... Whitewater.
Schreiter. ..... Darlington.
Smith, C. W. ..... East Troy.
Stanley, L. C. ..... Chippewa Falls.
Schermer, F. ..... West Depere.
Sanford, Henry ..... Manitowoc.
Shanks, W. M. ..... Alloa.
Shultz, L ..... Rio.
Smith, J. M. ..... Green Bay.
Schroeter, Gustav. ..... Grafton.

Thompson, Paul ..... Blair.
Tubbs, Peter ..... Seymour.
Taylor, H. C. ..... Oxfordville.
True, John M. ..... Baraboo.
Thatcher, Geo. ..... Black Earth.

Urguhart, John ..... Rio.

Varritey, Mathias ..... Appleton.
Vivian, Dr. J. H. ..... Mineral Point,

Wilson, T. B. ..... Menomonie.
Wilcox, Sheldon. ..... Depere.
Woodruff, N. A. ..... Eagle Point.
Walker, Ed ..... Lancaster.
Wyatt, L. D. ..... Tomah.
White, N. B. ..... Oconomowoc.
Weeks, N. S. ..... Oconomowoc.

Holstein Cattle.

Allen, Merrick T ..... Waupaca
Allanson, Geo ..... Neenah.
Anderson, Louis ..... Dallas.

Banks, E. J. ..... Chetek.
Baldwin, H. S. ..... Weyauwega.
Barber, F. D. ..... Tomah.
Barker, C. P. ..... Chippewa Falls.
Brown, William ..... Depere.
Bremner, John ..... Montello.
Berger Bros ..... Burlington.

Curtis, I. L. ..... Poynette.
Clark, S. S ..... Little Rapids.
Cronk, S. W. ..... Louisville.
Carrier, T. ..... Boscobel.
Chickering, I. B ..... Rusk.
Clemer, Geo ..... Lodi.
Chaplin, William ..... Plymouth.
Chapin, Geo. P. ..... Lodi.
Cheever, D. G. ..... Clinton.
Cochrane, Thomas ..... Eau Claire.

Dimond, Neal ..... Montello.
De Land, A. D. ..... Sheboygan Falls.
Dwinnell, J. B. ..... Lodi.

Evans, S. W., & Son ..... Danville.

Frost, E. D. ..... Almond.
Farrish, John ..... Grand Rapids.
Fuller, Bradley ..... Dallas.

Graves, J. W. ..... Hudson.
Glover, J. E. ..... Hudson.
Glock, T. ..... Weyauwega.
Green, R. P. ..... Fennimore.
Gillett, T. K. ..... Rosendale.
Grover, W. S. ..... Dallas.
Grant, N. S. ..... Wrighstown.

Hahn, M. ..... Sturgeon Bay.
Hickey, J. E., & Sons ..... Whitewater.
Hansen, M. R ..... Hansen.
Hyatt, A. X. ..... Sheboygan Falls.
Hutchinson, W. B. ..... Seymour.
Haily, D. ..... Depere.
Hamcar, J. J. ..... Depere.
Hanson, P. ..... Ft. Howard.
Harris, Dr. C. C ..... Dousman.
Holden, C. E ..... Hudson.

Johnson, Chris ..... Chetek.

Kurtz, John ..... Saukville.
Kibourn, J. M ..... Lancaster.

Lueps, W. G. ..... Manitowoc.
Lybrand, R. C. ..... Richland Center.
Leonard, L. B ..... Lake Mills.
Lynch, Anthony ..... New Richmond.
Lutz Bros ..... Grand Rapids.

Mosher, J. R ..... Racine.
Meyer, Peter ..... Appleton.
Mulroy, P ..... Hortonville.
Morse, L. C. ..... Sparta.
Moon, D. R. ..... Eau Claire.
Mills, Mrs. L. P. ..... Hortonville.
Myers, John ..... Appleton.
Moore, H. C ..... Fond du Lac.
Meyers, A., & Son ..... Beloit.
Maxon, F. W., Estate ..... Walworth.

Norton, Joseph ..... Depere.

Pelton, H. ..... Dallas.

Rush Bros ..... North Greenfield.
Rector, F. E. ..... Fennimore.
Richmond, James ..... Lodi.
Rowe, A. L. ..... Scandinavia.

Smith, John M. ..... Eau Claire.
Scott, Walter ..... Hudson.
Scott, M. J. ..... Bloomington.
Schroeder, F. W., & Son ..... West Bend.
Selle, Albert ..... Theinsville.
Sezberlich, Lorenzo ..... Saukville.
Schneider, Wm ..... Morrison.
Strang & Wells ..... Auroraville.

Thompson, G. W ..... Amherst.
Thomas, J. M ..... Dixon.
Trigg, J. E ..... Downing.

Urquehart, John ..... Rio.

Vinnett, Brono ..... Eagle Point.

Weaver, M. G ..... Clinton.
Wegemann, A. H ..... Lake Mills.
Winton, T. S. ..... Prospect.
White, D. M ..... Hudson.
Wintermute, Frank ..... Whitewater.

Ziegler, Fred ..... Apple Creek.

Guernsey Cattle.

Clapp, I. J. ..... Kenosha.

Fairbank, N. K. ..... Lake Geneva.
Foote, M. H. ..... Spring Prairie.
Foster, H. T. ..... Sparta.

Gerald, Geo. ..... Weyauwega.
Gordon, G. E. ..... Koshkonong.

Hackett, John, & Son ..... Augusta.
Hoard, W. D ..... Ft. Atkinson.
Houston, R. S. ..... Kenosha.
Hill, Geo. C., & Son ..... Rosendale.
Herron, William ..... Springville.
Hamilton, W I. ..... Fond du Lac.

Kent, Wm. ..... Rusk.

Nichols, Wm. ..... Trempealeau.

Remington, O. T. ..... Amy.

Sedgwick, G. G. ..... Manitowoc.
Schmidt, Nicholas ..... Greenleaf.

Tratt, F. W. ..... Whitewater.

Devon Cattle.

Baker, Geo., & Son ..... Hustisford.

Carswell, F. E. ..... Dixon.
Curtis, E. E ..... Berlin.

Eunis, Wm. ..... Palmyra.

French, H. ..... Galesville.

Groenveld, H. ..... Sheboygan Falls.

Hirschinger, Chas. ..... Baraboo.

Morse, J. W., & Son ..... Verona.

Northrop, J. D ..... Clinton.

Rawson, E. L. ..... Oak Creek.
Root, Philo ..... Hortonville.

Smith, John W. ..... Sparta.
Strong, John ..... Elkhorn.

Van Vonderen, Jno. ..... De Pere.

Hereford Cattle.

Anandale Live Stock Co ..... Ripon.

Berkitt, W. W. ..... Darlington.

Edwards, John, & Son ..... Fisk.

Foshay, Wm ..... Patch Grove.

Hicklin, James ..... Patch Grove.

Kevlin, John ..... Rutland.

Smith Bros. ..... Lancaster.
Sellers, J. W. ..... Viola.

Thompson, Geo. F. ..... Oshkosh.

Van Matre, N. K ..... Mineral Point.

Williams, J. J. ..... Berlin.

Yumgman, J. J. ..... Sparta.

Polled Angus Cattle.

Barber, Solan ..... Augusta.
Borah, J. N. ..... Lancaster.

Davy, Peter ..... Alderney.

Edgerton, S. R. ..... Spring Prairie.

Forbes, W. H. ..... River Falls.

Hoover, I. L. ..... Clinton.
Hughes, J. M. ..... Menomonie.
Hayes, John J. ..... Viroqua.

Kirkpatrick, J. C. ..... Rewey.

Leslie & Burwell ..... Cottage Grove.
Lilburn, Robert ..... Emerald Grove.

Ryan, John. ..... Bloomington.

Stone & McConnell Bros. ..... Ripon or Fisk.

Tainter, A. ..... Menomonie.
Torzer, Ole ..... Liberty Pole.

Van Valkenburg, Mr. ..... Chetek.

Red Polled Cattle.

Brann, Robert W. ..... Merton.

Dutten, Arthur ..... Centerville.
Daniels, Newell ..... Hancock.

Hoover, I. L. ..... Clinton.

Jomer, S. H. & A. E. ..... Janesville.
James, N. L. ..... Richland Center.

Keyes, E. W. ..... Madison.

Livermore, Foster ..... Augusta.

Martin Bros. ..... Gotham.

Steele, William ..... Merton.
Stone & McConnell Bros. ..... Ripon.

Ayershire Cattle.

Converse, A. D. ..... Whitewater.

Hazen, Chester, ... Brandon.

Uecke, John ..... Seymour.

Preston, S. D. ..... West Depere

Stilson, O. ..... Rochester.

Holderness Cattle.

Works, O. ..... Augusta.

Poland China Swine.

Armitage, S. P. ..... Seymour.
Ashton, Robert ..... Arcadia.

Bradley, W. C. ..... Hudson.
Buswell, S. N. ..... Amherst.
Baker, Geo., & Son ..... Hustisford.
Bonham, J. C. ..... Bloomington.
Bartlett, W. B., & Sons ..... Eagle Point.
Ballheim, Mr ..... South Osborn.
Beardsley, B. ..... Bloomington.

Carpenter, Nathan ..... Medina.
Convey, Thomas ..... Ridgeway.
Cole, John A. ..... Hustisford.
Cavil, Thomas ..... West Depere.
Carey, John ..... Bloomington.
Chreslaw, J. M. ..... Dane.
Carver, N. E. ..... Chetek.
Chappel, D. D. ..... Galesville.
Coolidge, S. E. ..... Augusta.

Day, Charles ..... Hudson.
Dyer, W. J. ..... Lancaster.
Dey, John ..... Hortonville.
Davenport, C. A. ..... Auroraville.
Dickson, Thos. ..... Waueka.
Drowtzky, B. ..... Tomah.

Edwards, James ..... Bloomington.

Felch, J. H. ..... Amherst.
Fowler, B. T. ..... Whitewater.
Fitch, F. B. ..... Darlington.
Fish, L. N. ..... Reedsburg.

Getts & Everson ..... Whitehall.
Gordon, Joseph ..... Mineral Point.
Green, Myron F. ..... Fulton.
Grisim, G. C ..... Prairie du Sac.

Hamilton, W. I ..... Fond du Lac.
Hackett, John, & Son ..... Augusta.
Huntington, A. W ..... Baraboo.
Held, Paul ..... Prairie du Sac.
Hillman, D. ..... Brandon.
Hickey, J. E., & Sons ..... Whitewater.
Hurley, James ..... Saukville.

Jackson, John ..... Mineral Point.

Lawrence, Charles ..... Danville.
Lytle, Geo. A. ..... Elkhorn.
Louis, Theodore ..... Louisville.

McGilvra, A. D. ..... Baraboo.
Morley, R. A ..... Baraboo.
Morrison, A. H ..... Morrisonville.
March, John ..... Shullsburg
McIntosh, C. H. ..... Lodi.
Mathews, Geo. G. ..... Burlington.
Mulroy, P. ..... Hortonville.
Marten, William ..... Darlington.

Parsons, Geo. ..... Tomah.

Richardson, W. P ..... Lancaster.
Roberts, R. E ..... Ives Grove.
Root, William ..... Hortonville.

Schuerman, G. H. ..... Richland Center.
Schnell, Louie ..... Tomah.
Steele, S. D ..... Lodi.
Scott, Kennedy ..... Rio.
Saunderson, Thos ..... Leeds.
Saunderson, Joseph ..... Cambria.
Schmidt, John ..... Hortonville.

Tubbs, Peter ..... Seymour.
Talcott, A. ..... Caldwell.
Taylor, A. M ..... Bloomington.
Treloar, J. J., & Son ..... Lancaster.
True, John M ..... Baraboo.

Urguehart, John ..... Rio.

Walker, Geo. A ..... Lancaster.
Willis, R. C. ..... Lancaster.
Waite, E. & Son ..... La Grange.
Wilcox, J. R ..... River Falls.
Wylie, Geo ..... Leeds.
Works, O. ..... Augusta.

Chester White Swine.

Austin, C. R. ..... Sparta.

Borland, John ..... Rusk.

Dey, John ..... Hortonville.

Evans, S. W., & Sons ..... Danville.

Holt, D. B. ..... Danville.
Harlow, O. T. ..... Whitehall.

Joiner, S. H., & A. E ..... Janesville.

Mooney, J. E. ..... Tomah.

Palmer & Noblet ..... Springfield.

Roberts, M. W. ..... Belle Fountain.

Smith, J. W. ..... Sparta.
Shroder, F. W., & Son ..... West Bend.
Stever, J. B ..... Louisville.

Thompson, S. ..... Darlington.
Tschudy, Fred ..... Monroe.

Wheeler, E. D. ..... Lima.
Wyatt, L. D. ..... Tomah.

Berkshire Swine.

Arnold, A. A ..... Galesville.

Brinkerhoff, F ..... Brandon.
Brabazon, J. R ..... Delavan.

Freeman, H. ..... Whitehall.

Metcalf, E. K. ..... Bloomington.

Owens, J. E. ..... Brooklyn.

Peterson, O. E ..... Amherst.

Smith Bros. ..... Lancaster.
Shurman, G. U. ..... Richland Center.

Wyatt, L. D. ..... Tomah.

Victoria Swine.

Curtis, J. L. ..... Poynette.

Nash, L. M. ..... Centralia.

Park Bros. ..... Caldwell.

Scoville, J. M. ..... Lowville.
Smith, S. B. ..... Caldwell.
Schroeter, G ..... Grafton.

Essex Swine.

Arlt, Adolph ..... Seymour.

Brooks, Seymour ..... East Troy.

Hartley, Mrs. Mary ..... La Crosse.

Necke, John ..... Seymour.

Suffolk Swine.

Cass, J. D ..... Beloit.

Foster, Asa ..... Elkhorn.

Hughes, J. M. ..... Menomonie.

Joiner, S. H. and A. E ..... Janesville.

Spanish Merino Sheep.

Andrews, F. S. ..... Mukwonago.
Armitage, S. P. ..... Seymour.
Abrams, L. ..... Bloomington.

Baker, Geo., & Son ..... Hustisford.
Buttler, E. T ..... Waterford.
Brooks, Seymour ..... East Troy.
Brinkerhoff, F. ..... Brandon.

Crawford, J. N. ..... Mukwonago.
Craig, A. H. ..... Caldwell.
Copeland, Chas. ..... Jefferson.
Curren, W. B. ..... Lodi.
Cleland, Chas. S. ..... Janesville.
Clapp, I. J. ..... Kenosha.
Craig, Perry ..... Caldwell.

Dixon, J. H ..... Brandon.

Everets, W. H. ..... Leeds Center.

Fleming, Robert ..... Wilmot.
Foote, M. H. ..... Spring Prairie.
Fraser & Lobdel ..... Mukwonago.

Gould, A. F. ..... Lima.
Green, F. H. ..... Leeds Center.
Gale, Isaac ..... Waukesha.

Holt, D. B. ..... Danville.
Humbert, Floyd, ... Caldwell.
Humbert, Leon. ..... Caldwell.
Holmes, A. ..... Douglas Center.

Jones, Ed. ..... Lima Center.
Jones, D. B. ..... Weiner.
Jones, S. B. ..... Hustisford.
Jones, S. R. ..... Hustisford.
Jones, S. A. ..... Hustisford.

Lewis, Geo. A ..... Fond du Lac.

Manley, H. H ..... Hortonville.
McConnell & Bros. ..... Ripon.
McCormick, E. ..... Mt. Hope.
Morley, I. W. ..... Ablemans.
Mill, R. H. ..... Palmyra.

Parker, Wm. E. ..... Beaver Dam.
Phelps, C. K. ..... Springfield.
Paul, J. H. ..... Genessee.
Porter, Geo. T. ..... Caldwell.
Pitcher, J. H. ..... Eagle.

Vanderpool, Geo. J. ..... Mukwonago.

Smiley, Wm. ..... Albany.
Sayre Bros. ..... Fulton.

West, Nelson. ..... Fayetteville.

Randolph, N. ..... Troy Center.
Roberts, R. E. ..... Ives Grove.
Rynden, W. ..... Stephensville.

Wilkinson, H. J ..... Whitewater.

Shropshire Sheep.

Barber, Solon ..... Augusta.

Forest, W ..... Poynette.
Fellow Bros. ..... Foscoro.

Glover, J. E. ..... Hudson.

Kelsey, W. T. ..... Prairie du Sac.

Lewis, Wm. ..... Bloomington.

McKerrow, Geo ..... Sussex.

Owens, J. E. ..... Brooklyn.

Payne, J. C. ..... Prairie du Sac.

Wildman, Wm. ..... North Andover.

Cotswold Sheep.

Arlt, Adolph. ..... Sawyer.

Bryant, Geo. E. ..... Madison.

Day, Chas. ..... Hudson.

Harding, Geo. ..... Waukesha.

Lawrence, A. W. ..... Sturgeon Bay.

Morey, James ..... Merrimack.
March, John. ..... Shullsburg.

Nash, L. M. ..... Centralia.

Roberts, Mark W. ..... Bellefountain.

Smith, John M. ..... Eau Claire.

Southdown Sheep.

Fuller, A. G.	Seymour.
Fellow Bros.	Foscoro.
Sheldon, B. F.	Brandon.

Poultry Breeders.

Ballheim, Frank	South Osborn.
Belding, C. H.	Shopiere.
Bishop, Dr. L. A.	Fond du Sac.
Brabazon, J. R.	Delavan.
Coleman, J. E.	Evansville.
Ewins, Wm	Palmyra.
Gibbons, G. B.	Baraboo.
Green, R. C., & Co	Albion.
Hamea, A	Bloomington.
Ketchum, I. P.	Madison.
Kenling, Julius.	Hope.
Leonard, F. A.	Door Creek.
Martin, Ed.	Fond du Lac.
McFarland, Wm. H. (Brahmas and Y....)	Madison.
Oak Grove Poultry Yards.	Platteville.
Richmond, H. C.	Lodi.
Scott, M. J	Bloomington.
Smith & Hayes	Madison.
Smith, J. W.	Sparta.
Steves, J. B	Louisville.
Thomas, J. W.	Chippewa Falls.
Thompson, Paul	Blair.
Tilson, Mrs. Ida E.	W. Salem.
Tong, Job	Sturgeon Bay.

Cheese Factories and Creameries.

Antone, A.	Belgium.
Allen, Merreck T.	Springhill.
Algoma Creamery Co.	Oshkosh.
Armstrongs	Armstrong's Corners.
Airhart, E.	Mitchell.
Baltz, C. W	Calumet.
Bamford, Henry	Plymouth.
Bartram, G. A.	Rural.
Barrett, Wm.	Dykesville.
Bean, F	Calvary.
Best, John.	Johnsonville.
Bates, A. M.	Mondovi.
Bertram, C.	Johnsburg.
Bitter, John.	Sheboygan.
Benscke, D	Fontenoy.
Beyer, H. S.	New Denmark.
Bleecker, J. R.	Hubbleton.
Braun, C.	Sullivan.
Bovcher, L.	Dyksville.
Bovina Cheese Factory	Shiocton.
Bourgeois, H.	Mt. Calvary.
Brehm, Fred.	Sheboygan.
Broser, John.	Dundee.
Brobet, John.	Gilmanton.
Bristol, A	Oakfield.
Bionier, A	Johnsburg.
Brayton, Mrs. J.	Fond du Lac.
Brown, Ira A.	Fond du Lac.
Brown, O. P.	Byron.
Busher, C.	Ada.
Carrier, S. E	Oak Centre.
Campbellsport Factory	Campbellsport.
Catlin, J. P.	Royalton.
Campbell & Hutchinson.	Lake Miils.
Campbell & Dodge.	Lake Mills.
Carlin, James.	Greenbush.
Casey, Michael.	Watertown.
Chaplin Factory.	Plymouth.
Christians, H. C.	Johnsons Creek.
Church, M. H.	Delavan.
Carr & Gessling.	Glendale.
Clark, J. J.	Berlin.
Cosgrove, M.	Rathbun.
Dasson, John	Sheboygan Falls.
Dasson, Jacob C.	Sheboygan Falls.
Damrow, Louie.	Franklin.
Deitch, Chas	Plymouth.
Debauche, Oliver	Brussells.
Dulmer & Rowerdinke.	Oostburg.
Dupont, G.	Robinsonville.
De Schmidt, Isaac	Cedar Grove.
Dailey	Mitchell.
Eastman, Chas.	Plymouth.
Ehren, John.	St. George.
Ehrlich, Otto.	Sheboygan Falls.
Erdman, Will.	Plymouth.
Erbslveszer, H.	Sheboygan Falls.
Erpstolszen, Edward.	Howards Grove.
Evans, Dave, Jr.	Berlin.
Ehrhart, E.	Malone.
Eggers, Geo	Fond du Lac.
Estabrook, C. E.	Fond du Lac.
Fargo, E. B.	Lake Mills.
Fasse, Adolph.	Johnsonville.
Fills, Joseph.	Luxenburg.
Flath, W.	Glenbuelah.
Floral Creamery	Omro.
Floyd, Chas.	Eureka.
Foster, J. H.	Koro.
Fox, M. B	Glendale.
Frick, John.	Plymouth.
Fleishman, M	St. Cloud.
Gates, C. W.	Winooski.
Gaeble, Geo	Sheboygan.
Gerlach, Chas.	Grafton.
German & Wyman.	Lake Mills.
Gibbs, Charles R.	Whitewater.
Gibson, Chas.	Lind.
Gilow, Henry	Cedarburg.
Goldbeck, Wm.	Plymouth.
Gosen, A.	Walhaine.
Grecsel, Anton.	Luxemburg.
Green, M. H.	Reeseville.
Griffith, J. N.	Whitewater.
Guernsey Creamery.	Koshkonong
Grolenhuis, G., & Co.	Cedar Grove.
Gartman, August	St. George.
Geffin, W.	Lancaster.
Gehl, M. N	Nenno.
Goutermont, Wm.	Peebles.
Geulich, H	Calvary.
Harris, John	Spring Prairie.
Halsley, C.	Elmore.
Hobbs, W. A	Brandon.

Cheese Factories, Etc.—Continued.

Hobbs, A. J	Brandon.
Haskins, J. A	Waupun.
Hadcock, E. W	Waupun.
Ham, W. A	Fox Lake.
Hazen, C	Ladago.
Haggerty, S. A	Mt. Sterling.
Heisdorf, John	Edwards.
Helmer, L	Plymouth.
Hornick, Geo	Rhine.
Hornick, Philip	Rhine.
Hartman, John	Gibbsville.
Hopeman & Kaffers	Gibbsville.
Hopeman, Wm	Cedar Grove.
Haen, John H	Sheboygan.
Hoard, A. R	Ft. Atkinson.
Hilltop Cheese Factory	Watertown.
Hustisford Cheese Factory	Hustisford.
Hartie, George	Ft. Atkinson.
Hubbell & Co	River Falls.
Harrnese, Joseph	Darbellay.
Halle, Victor	Lincoln.
Ingalls, E. P	Milford.
Innis, W. T	West Rosendale.
Jones, D. D	Fond du Lac.
Jenkens, E. S	Rosendale.
John Bros	Sheboygan Falls.
Kissinger, Paul	Waupaca.
Kipky Grove Factory	Lake Mills.
Kalmerton, Chas	Sheboygan Falls.
Knowles, C. M	St. Cloud.
Kirchheck, Henry	Howards Grove.
Kuehne, C. W	Johnsonville.
Koenig, Henry	Sheboygan Falls.
Kuntz, Geo	Sheboygan Falls.
Karsteaedt, C. F. F	Mosell.
Kunce & Co	Sheboygan.
Krebsbeck, J	Johnsburg.
Kirby, N. W	Brownsville.
Kecher, John	Campbellsport.
Koch, G. G	Knowles.
Luecke, Fred	Howards Grove.
Lefebore & Son, O	Schiller.
Lutze, A	Sheboygan.
Leroy, Will	Waldo.
Locher, L	Johnsburg.
Leonard, A	Dotyville.
McAllister, J. D	Mills Center.
McCanna, C. B., & Co	Burlington.
McKinnon, M	Sheboygan Falls.
McCredie Bros	Ft Atkinson.
McFarlane, W	Eden.
McKinney, F. M	Fond du Lac.
Meichels, M. J	Calumet Harbor.
Manel, W	Ashford.
Murray, John	New Cassel,
Moerich, M	Calumet Harbor.
Mathews, Jos	Auroraville.
Mayhew, G. C	Greenbush.
Murray, John	Parnell.
Maves, Otto	Howards Grove.
Miller, J. W	Scott.
Melendy, E. B	Sheboygan Falls.
Millard, Chas. C	Lake Mills.
Marshall, Robert	Lake Mills.
Mansfield, G. H	Johnsons Creek.
Milford Road Factory	Milford.
Moses, J. R	Ogdensburg.
Murphy, A. L	Hortonville.
Meyer, H. F	Greenleaf.
Nathway Bros	Pine Grove.
Noyes, H. J	Richland, city.
North Road Factory	Milford.
Oatman & Bros	Lake Geneva.
Ochs, Julius	Howards Grove.
O'Connell, James	Pins.
O'Connell, John H	Beechwood.
O'Connell, E. M	Beechwood.
Paulsons, E. B	Rosendale.
Peters, W	Wayne.
Pauly, J	Calvary.
Peebles, E	Peebles.
Petri, A	Calvary.
Phillips, F	Brothertown.
Payne, J	Edwards Mills.
Port, Nick	Belgium.
Page Bros	Berlin.
Perrot, Lewis	Greenville.
Perriot, Louis	Belgium.
Piperville Cheese Factory	Piperville.
Peck, Joseph	Waldo.
Pfiel, Val. G	Greenbush.
Prang & Co	Sheboygan Falls.
Pfeiffer, J. T	Franklin.
Pierson, Nick	Belgium.
Quick, John	Lamartine.
Ray, Wm	Empire.
Reitz, H	Dotyville.
Redington, James	Pins.
Roeder, H. G	Edwards.
Rowerdink & Dulmer	Gibbsville.
Reneking, C	Franklin.
Roeder, F. W	Johnsonville.
Riess, Henry	Elkhart.
Reseburg, Louis	Franklin.
Rehn, H. A	Franklin.
Ripon Creamery	Ripon.
Roach & Seeber Co	Waterloo.
Riverside Factory	Milford.
Robinson, A. E	Waupaca.
Roth, Joseph	Ellisville.
Rhodes, Thomas	Watertown.
Sargent, S. W	Brandon.
Stratz, J. A	Woodhull.
Smidt, A	Fond du Lac.
Sice, G. W	Mitchell.
Sackett, H. F	Wauconta.
Steiner, J. B	Lomira.
Schafer, P	Calumet.
Stollenwert, J. J	Calvary.
Stoddart, W	Waupun.
Skinner, S. E	Brandon.
Smith, J. A	Glenbeulah.
Stracks & Nevill	Alto.
Stephany, A	Malone.
Stephany, P	Peebles.
Stellen, G. W	Brandon.
Sebling & Grolenhies	Oostburg.
Schibe, Herman	Plymouth.
Strub, J	Rhine.
Stecker, John	Plymouth.
Swann, Robert	Cascade.
Schultz, Herman	Johnsonville.
Schneider, Edward	Howards Grove
Schueller & Co	Belgium.
Schueller, John B	Belgium.
Schmidler, Frank	Dacade.
Scheid, John	Ada.
Spranger, M. H	Oostburg.
Springham, Wm	Sheboygan.
Smith, John A	Glenbuelah,
Shields Factory	Hubbleton.
Stilson & Co	Oshkosh.
Snyder	Waukaw

Cheese Factories, Etc.—Continued.

Smith, J. H.	Waupaca.
Sherman, Adolph	Plain.
Smith & Eastman	Saukville.
Stubbs, Chas.	Lyons.
Smithurst & Potter	Seneca.
Town, J. W	Waupun.
Thayer Refrigerator Co	Union Grove.
Tenddchel, August	Sheboygan Falls.
Thackray, J. H.	Glenbuelah.
Ternes, John	Belgium.
Teronda, Henry	Oostburg.
Themer, C. F.	Sheboygan.
Tenpass, Garrett	Hingham.
Vaughn, W. A.	Wauzeka.
Vanderwall, John	Cedar Grove.
West, Walter	Elkhorn.
Wagner, J	Calvary.
Watson, D. R	Fond du Lac.
Wirtz, M	Dotyville.
Wirtz, Geo	Dotyville.
Whiting, N	Waupun.
Walters, A	Eden.
Whiting, A. C.	Ladoga.
Wagner, Mat	Malone.
Wagner, Louis	Thiensville.
Webber, N. W.	Lima Center.
Waumandee Cheese Factory.	Waumandee.
Winn & Breeden	Richland Center.
Waterloo Cheese Factory	Waterloo.
Wedenmeyer, Theo.	Waterloo.
Weiner, Henry	Weiner.
Woudruff, W. H.	Green Bay.
Werg, Joseph	Darbelley.
Wittig, F	Fontenoy.
Widder, Herman	Hingham.
Webb, Geo.	Greenbush.
Wolf, August	Cascade.
Wester, Melchion	Belgium.
Wellenstein, John B.	Belgium.
Wiselink, John	Gibbsville.
Walvoord, Tony	Cedar Grove.
Walvoord, Henry	Cedar Grove.
Widder, Fred.	Sheboygan.
Winch, Henry	Mosell.
Yanneys, Wm.	Medina.
Zimmerman, Antoine	Saukville.

UNIVERSITY OF WISCONSIN.

BOARD OF REGENTS.

THE STATE SUPERINTENDENT, EX OFFICIO.

STATE AT LARGE,	HON. GEO. H. PAUL, PRESIDENT.
STATE AT LARGE,	HON. E. W. KEYES, CH'N EX. COM.
1ST DISTRICT,	HON. J. G. McMYNN.
2D DISTRICT,	HON. HENRY D. HITT.
3D DISTRICT,	HON. GEO. RAYMER.
4TH DISTRICT,	HON. GEO. KŒPPEN.
5TH DISTRICT,	HON. HIRAM SMITH.
6TH DISTRICT,	HON. FRANK CHALLONER.
7TH DISTRICT,	HON. C. H. WILLIAMS.
8TH DISTRICT,	HON. WM. P. BARTLETT.
9TH DISTRICT,	HON. R. D. MARSHALL.

Committee of Board of Regents in Charge of Farmers' Institutes.

HON. HIRAM SMITH, Chairman,	SHEBOYGAN FALLS.
HON. H. D. HITT,	OAKFIELD.
HON. C. H. WILLIAMS,	BARABOO.

W. H. MORRISON, Superintendent.

Office — No. 12, Capitol,

MADISON, WIS

LIST OF FARMERS' INSTITUTES, 1888-9.

Towns or Cities.	*Counties.*	*Date.*
Kewaunee	Kewaunee	Nov. 13, 14
Friendship	Adams	Nov. 20, 21
Amherst	Portage	Nov. 23, 24
Mondovi	Buffalo	Nov. 27, 28
Bloomington	Grant	Nov. 27, 28
Mt. Sterling	Crawford	Nov. 30, 1
Platteville	Grant	Dec. 4, 5
Dodgeville	Iowa	Dec. 6, 7
Darlington	La Fayette	Dec. 11, 12
Brodhead	Green	Dec. 13, 14
Plainfield	Waushara	Dec. 18, 19
Westfield	Marquette	Dec. 20, 21
Berlin	Green Lake	Dec. 26, 27
Hortonville	Outagamie	Dec. 28, 29
Eau Claire	Eau Claire	Jan. 9, 10
Eggleton	Chippewa	Jan. 11, 12
Baldwin	St. Croix	Jan. 11, 12
Osceola Mills	Polk	Jan. 14, 15
River Falls	Pierce	Jan. 15, 16
Menomonie	Dunn	Jan. 17, 18
Durand	Pepin	Jan. 17, 18
Arcadia	Trempealeau	Jan. 22, 23
Viroqua	Vernon	Jan. 22, 23
Fountain City	Buffalo	Jan. 24, 25
Sparta	Monroe	Jan. 24, 25
West Salem	La Crosse	Jan. 29, 30
Reedsburg	Sauk	Jan. 31, 1
Oregon	Dane	Feb. 5, 6
Delavan	Walworth	Feb. 5, 6
Janesville	Rock	Feb. 7, 8
Union Grove	Racine	Feb. 7, 8
Port Washington	Ozaukee	Feb. 11, 12
Sheboygan Falls	Sheboygan	Feb. 13, 14
Manitowoc	Manitowoc	Feb. 15, 16
Black River Falls	Jackson	Feb. 18, 19
Mauston	Juneau	Feb. 20, 21
Waupaca	Waupaca	Feb. 26, 27
West Bend	Washington	Feb. 26, 27
Fond du Lac	Fond du Lac	Feb. 28, 1
Kenosha	Kenosha	Feb. 28, 1
Portage	Columbia	Mch. 5, 6
Beaver Dam	Dodge	Mch. 7, 8
Phillips	Price	Mch. 11, 12
Medford	Taylor	Mch. 12, 13
Wausau	Marathon	Mch. 12, 13
Colby	Clark	Mch. 14, 15
Grand Rapids	Wood	Mch. 14, 15
Green Bay	Brown	Mch. 19, 20
Richland Center	Richland	Mch. 19, 20
Chilton	Calumet	Mch. 21, 22
Lake Mills	Jefferson	Mch. 21, 22
Waukesha	Waukesha	Mch. 26, 28

52

Closing Farmers' Institute—1888.

MADISON, WIS.

In many respects that was a remarkable little band which associated itself for the purpose of founding the Wisconsin Dairymen's Association. Their sole object seems to have been the aggressive advancement of dairying in Wisconsin, and wonderfully well have they succeeded. It is common enough to see men join together for an implied common purpose, but time usually shows that some of the number, at least, are seeking personal preferment or aggrandisement, and dissension and troubles usually sap much of the possible strength of the organization, while jealousies are only too common. From the first we observe a different spirit ruling in this society, where each member seemed willing to sink his personality out of sight for the good of the society, and to rest content with doing the work assigned him and seeing the society advance. What is the result? To-day the Wisconsin Dairymen's Association stands as the strongest society of the kind in America, if not in the world. Every one of its patient workers, instead of losing personality by thus shutting out jealousies and aspirations has found himself known and respected all over the State, while some of the number have gained a national reputation by their words and

deeds. It is the old story, so hard to learn,—they who would gain real honor must do so by patient well doing.

Hiram Smith, the subject of this sketch, is known to every farmer of the State, and stands a respected representative of the farming people. Years of patient labor with co-workers in the State Dairymen's Association gave him training in thinking, speaking and writing, and made possible farther advancement to positions of honor and trust. What he has done for dairying and the dairy association is enough for one man, either in the amount of sacrifice and labor undergone, the good done, or the honors which have followed; but his sphere was destined to be large. In 1878, he was appointed a Regent of the University, with the understanding that the agricultural side of that institution was to be pushed to its proper position, as desired by the people and needed by the State. From the date of his appointment the department took on new life, and has continued to grow and expand. A series of farmers' meetings were planned, and Mr. Smith, with the professors of agriculture and invited speakers, went about the State holding a series of farmers' meetings, or what would now be called, farmers' institutes. A professor of agriculture was appointed, who should give his whole time to agriculture, and then came the experiment station and the farmers' institutes, the character and work of which are so well known and appreciated by our people. The same spirit which was carried into the Dairymen's Association was taken into the Regency, viz.: That hard, patient work was called for, and, primarily, nothing else.

Those who have wondered at the success of our institutes and the agricultural department of the University generally, should bear in mind that nothing, especially nothing good, comes by chance in this world, and that the Regents of the University patiently and laboriously planned and arranged what has been so successful and smoothly carried out.

The subject of our sketch has been charged by some as being too much of a partisan for dairying, but how could he be otherwise? The central thought of his life and main-spring of action has been, that a single thing well done is worth a thousand half-hearted attempts, and that proficiency and experience are too valuable adjuncts to success to be lightly thrown aside. He started in as a dairyman and has seen no reason to change his course. Let those who follow other lines stand as firmly to their purpose as he has to his, and Wisconsin's agriculture will lead every State in the Union. Those who know him best, long ago learned his broad charity and sympathy for the man in dead earnest in any line of profitable agriculture.

Such a life is of untold value to our agricultural people. It shows that by well doing and unselfishness a farmer can rise to the highest esteem in the hearts of his fellow-citizens, and be respected by all classes. That good work tells in agriculture just as well as in law or medicine, and that patient continuance in one course, with a desire to do good work, is the way to attain distinction and lasting honor. To our young men who are to follow farming, such an example is worth untold millions, for it shows that there is something better in this life than simply piling up money, and that real success is born of industry, intellect, and unselfishly working for others.

HORTICULTURAL SESSION—MARCH 27.

THE HORTICULTURE OF WISCONSIN.

By B. S. HOXIE, Rock County, Wis.

First Paper.

JOHN GOULD, in the Chair:

Our Fruit Crop.—The dairymen tell us that the products of the dairy in our state amount now to the sum of $20,000,000 annually. Our lumber is worth about $27,000,000, we raise nearly 21,000,000 bushels of wheat, and sell hogs to the amount of $10,000,000. Now, these figures are valuable; the sums are enormous, and, when I bring alongside of them the fruit crop of Wisconsin, you will say it is a small item, for our last census shows that we produced in the year 1885, 1,675,000 bushels of apples at a value of $639,000, grapes valued at $30,000, and a berry crop valued at $180,000. Now, this appears quite insignificant, when compared with the larger amounts I have given, and yet they are below the actual yield; for there are hundreds of bushels of apples, tons of grapes, and crates of berries which can only be estimated by the size of the average small boy's pocket, for who would ever think of looking there for a quart of wheat, a pound of butter, a chunk of cheese or a small pig, for a boy to nibble on.

Measure of Values.—I know the common opinion is that a thing is worth what it will bring in market. Is that true? Our prominent dairymen tell us that a cow does not more than earn her keep if she produces only 150 pounds of butter annually. The cost to produce a bushel of wheat is about 50 cents, and lumber, in such a winter as this, is manufactured at a small margin of profit, and we are gravely informed that if Canadian lumber is admitted duty free, it will drive our lumbermen out of the market, while the average value of an acre of wheat has fallen off from $12.48, in 1880, to $8.25, for the year 1887. Now, these data are from reliable sources, and would seem to indicate that values should not always be measured in bushels or acres, but that we should attach some importance to the cost of production, and the net results.

Money in Fruit Growing.—I know that some people imagine that fruit growing or market gardening is rather small business, and because we cannot produce apples by the million bushels, and every man raise them as easily as he can burdocks and thistles, that there is no money in it. Now, while it is true that our state is not so favorable for this fruit as is Michigan, yet there are portions of it where apple orchards, for

commercial purposes, yield a good profit to their owners. Mr. A. L. Hatch, of Ithaca, Richland County, in 1886, raised 2,000 bushels for market; and J. M. Smith, of Green Bay, as a market gardener, makes more clear profit from forty acres of land than most of our farmers do from ten times that amount, for his sales reach some $14,000 annually.

Small Fruits.—In small fruits Wisconsin has no rival in quantity or quality, and in strawberries I think we outrank any state in yield per acre, while for varieties of grapes that will mature in our climate, we have them as good as can be grown in the United States. The net profit per acre of small fruits, such as strawberries, raspberries, blackberries, etc., is from $50 to $150 per acre, and this industry with us is rapidly on the increase. J. M. Smith, who has just visited California as a delegate to the American Horticultural Society, in the conclusion of his report, has this to say:

"In the small fruits, such as strawberries, raspberries, blackberries and currants, I am satisfied we can far excel California in quality and quantity. Their apples are far below ours in quality; neither is the yield very large, and we have fully as large a proportion of comfortable homes in Wisconsin as any state in our Union, and I have traveled through many of them and speak from knowledge."

Quality and Quantity.—The quality and quantity of our fruit is just beginning to be appreciated, and though I cannot now give the number of acres, I will mention that some of our grape growers have vineyards of six or eight acres, and at Ripon there are about 200 acres in blackberries. That city is getting a grand reputation for this kind of fruit, and the plantations in that vicinity are increasing every year; in fact this is true of all our fruit growers all over the state, and, moreover, they are meeting with large success. Mr. Anderson, one of our small fruit growers at Neenah, says that one acre in grapes will bring more dollars and cents than twenty acres in grass. Another gentleman at Appleton has successfully fruited over forty varieties of grapes the past season; so there is no longer any reason why every householder in Wisconsin should not raise enough of this valuable and easily produced fruit for his entire family.

Thirty years ago where there was one growing grape vine there is to-day more than one thousand. Mr. J. S. Hubbard, of Fredonia, New York, says there are in that state over forty thousand acres of grapes grown for table use. Three to four tons an acre is a fair crop, and they can be grown at a fair profit, for three to four cents per pound (Concord is the prevailing variety). From one township in Ohio, last year, there was shipped 1,800 tons of grapes, and it was no unusual thing for seven car-loads a day to be shipped from one station. There is no fruit grown that is more healthful than the grape, and I can see no reason why we could not have dyspepsia grape cures in this country, as they do on the Rhine, for it is quite sure that the future man will eat more fruit and less meat.

Florists' Sales.—Now, let me go outside of our state for one other fact to illustrate my subject. In 1844 one of the principal florist firms of New York City did well if their sales on New Year day amounted to $200, but last year that firm sold 50,000,000 plants and flowering shrubs, and their aggregate sales amounted to $2,500,000. Mr. J. M. Smith gives as one reason why he is a horticulturist, that it affords a "happy competency," and if I were to write a complete volume on horticulture, I could give it no greater potency than that one sentence, as a final argument.

Horticulture in the Schools. — Horticulture and botany should be taught in all our public schools, for horticulture means, in quite a large sense, intensive agriculture, and a good knowledge of botany I am sure would be quite as useful as that of algebra. In France, Austria, and Sweden, there are thousands of schools with gardens attached to them, under the care of competent teachers. It is quite common with us to plant trees in our school and college grounds, but we very rarely see fruit or vegetables. I do not believe that the boys and girls would be vandals if this were the case, but I do believe they would grow up to be truer men and women. Do you know a school-yard of beauty? If you do, it is one where trees, plants and flowers have their proper place in it. For I think our highest standard of beauty in nature, is largely confined to trees, groves and flowers, and our best teachers are those who teach from nature The horticulturist of Wisconsin should know that thousands of school-grounds in our state need to be planted to trees and shrubs.

Trees in School-yards.— Children need the influence which can be imparted by trees and flowers, and we can do it in no better way than by planting them in every school-yard. Railway stations need the ornament of trees and plants, when it can be done with such a trifling expense. We learn by contact and association, and if the associations of child life are not filled in with the useful, the good and the beautiful they most certainly will be with the ugly and harmful.

Parks.— Every village and city in our state should have its park, or parks, and these grounds should be attractive for their beauty of art and nature. Even the densely populated city of London has 30,000 acres in parks. If saloons are the breathing places of hell, parks in the city are paths to joy and the open gates to heaven. Would the people here in Madison for a price vote to have this park, or this capitol ground, stripped of its trees? I think not. But how many boys and girls in this city can give me the common name of every tree in this park, or its commercial use or value, and why? Every boy and girl should not only learn the names of the plants and trees they come in contact with, but every farmer's boy should know how to properly plant a tree and care for it.

The Field of Horticulture.—Horticulture is not simply the setting out and pruning of an orchard tree, or to raise apples for the market. Plants and trees of all kinds, birds and insects, their preservation or destruction, all of these, claim the attention of the Wisconsin horticulturist.

Rare plants, trees and shrubs are being imported or produced in our own country every year, and Wisconsin growers are not far behind in this work. The men who originated the Concord grape, the Wilson strawberry, or the Wealthy apple are public and national benefactors, and possibly these benefactions may take in our own Wisconsin, by including the Wolf River apple, the Northwestern Greening, and the Jessie strawberry. With all or any of these I have no special pleading to make, but I am quite certain that nearly every Wisconsin farmer can raise all the summer and late fall apples that his family needs at a minimum of cost, when the larger item of pleasure, and the abundance of healthful food are taken into account. I know of many farmers who continually say we cannot raise apples in Wisconsin, whose boys just as continually every year poach on their neighbor's orchard. Suppose you have

planted some varieties which have failed. Is this a sufficient reason for neglecting to plant another tree? Is there any crop which is always sure, except it be that of vice and weeds? The road to success in any calling is not by the way of indolence, and though fruits are so luscious, trees plants and shrubs so beautiful, yet he who produces them does not always live in a state of bliss, for his enemies are counted by millions, and his friends at harvest time by the hundreds.

Discussion.

MR. J. M. SMITH.—I want to ask Mr. Hoxie what profits he named per acre for small fruit?

MR. HOXIE.—I think I named a fair profit to be from $30 to $50.

MR. SMITH.—Is that the best you can do?

MR. HOXIE.—Perhaps we can do a good deal better than that, but when a man talks about the profit he can make on an acre of wheat which costs fifty cents a bushel to produce, that is a pretty good profit. I think Mr. Hamilton, of Ripon, the fruit grower, will give us a larger profit, and Mr. J. M. Smith, who asks the question, a much larger profit.

MARKET GARDENING.

By J. M. SMITH, Green Bay, Wis.

Second Paper.

The Soil.—I have in my library at home, quite a number of books on gardening, the best containing about five hundred pages, and I am told by our friend Morrison that I can have twenty minutes to tell you about market gardening, but perhaps I can tell, in that time, the most that I know. I will give you only the outlines. I prefer a light sandy loam for the following reasons: It is an easier soil to cultivate. A friend of mine who is doing something in the line of gardening on a very heavy clay, estimates that it costs him three times as much per acre to cultivate a given crop upon his soil, as it does me upon my soil, mine being a light sandy loam.

Another reason why I like it best is that it is a little earlier in the spring, the crops will grow upon it a little faster, and they will be ready for the market a little earlier, which gives the light soil a great advantage. The crops may not be any larger in the aggregate, but very often you have three or four days or a week advantage in earliness of the crop and that will just make the difference between a handsome profit and a handsome loss, if you might call it so, so that other things being equal, let us have the light sandy loam.

The Manure.—My friends, no soil is rich enough to make garden upon and do it successfully without artificial fertilizers. Hence, we must have it manured,

and I like to put on at the rate of thirty to forty loads per acre each year. I manure all my land every year, no matter what the crops are, and sometimes twice a year. You may think that it is heavy manuring, and so it is, but we want to take two crops, sometimes three, off a piece of land in the course of the season, and that we often do, even as far north as Green Bay, and I have tried a number of times to get the fourth one, but have never made a brilliant success of that crop.

The First Planting.—Our first planting in the spring commences as soon as the ground is fit to work; we don't wait a day after this, and it consists of peas, common early peas, the earliest varieties that we can get. If planted so early, they will be getting along slowly even in cold weather when the ground is not frozen, and if the ground freezes afterward, they will come up. It will hurt some of the more tender varieties, but the common early pea, the extra early Dan O'Rourke, the early Philadelphia (all these are really the same variety) we plant as early as the ground is fit, in rows three or three and a half feet apart, and then we sow radishes, or some quick growing crop, between the rows, that will be out of the way before the peas come on. The peas in their time are out of the way to put in another crop—a crop of late corn, cabbages or rutabagas, something of that kind, so there is no trouble is getting on a piece of land, that is well cared for, three crops.

Any of these very early varieties of peas are all one and the same, and they are good. Among peas, as a general rule, the sweet or sugar varieties, the wrinkled varieties, are not as hardy as the others, and should not be planted as early, because they will either rot in the ground or, if they come up, will be feeble and not make a nice crop; so do not plant them until the ground gets warm.

Parsnips—Are another thing that may be sowed very early, provided the ground is in good condition. Carrots, beats, turnips, all of that class, will bear a little freezing, after they come through the ground, without being injured.

Asparagus.—I have forgotten one thing—the asparagus bed. That is one of the first things to be cared for, and no market garden is complete without it.

On this subject a great deal has been said and written that is pure unadulterated nonsense. In a few words, I will try and tell you how I make asparagus beds, and I have never seen asparagus that excelled mine except once in Philadelphia, where there was some from Paris that was better than mine.

Making the Beds.—My beds are made in the following manner: The ground is a light sandy loam, manured very heavily—all we can plow under. After plowing and harrowing, we take a shovel-plow and make the rows three or three and a half feet apart, and six inches deep, at least. In these furrows we place our plants, one year or two, perhaps three, but not more than three-year-old plants. From the older roots, you don't get such a good crop; about two years old are the best. Plant them deep enough so that the ground from which the stalk starts from the plant will be, when it is leveled off, from four to six inches beneath the top of the soil. Put the plants in this way about fifteen to eighteen inches apart. After they are in, the roots spread out and simply fill up your furrow, and your bed is made. It is a very simple matter, and you have only to keep the weeds and grass out and let it grow. The following spring, when the snow goes off, cut off the tops that have grown during the

year and put on some more manure, always estimating that you can't get too much manure on an asparagus bed. We take our common six-tine manure fork and just fork it in, and it is done very rapidly; but be careful not to dig deep enough to injure the roots of the plants. Then, rake off your bed and there it is ready for another year, and your work done with the exception of keeping out the weeds.

Cutting.—The plants will bear some cutting the second year, but not much. You may cut them for two or three weeks or possibly a month, always remembering to cut the stalks clean, no matter whether they are large enough for market or not; but cut them off clean so that when the bed grows up, it will all come up together. At the beginning of the third year, you can cut quite largely, but it will not cut at its best until the fourth or fifth year, but to make up for that, it is good for a life time. My oldest beds are, I think, over twenty years old, and they are certainly as good as they ever were, and I think have been improving within the last five years. Now, gentlemen, that is all there is to it, and I hope you all will make asparagus beds this spring, if you haven't them. There is no article in our garden which will raise so large an amount of food as asparagus, and it takes but a small bed to feed a family during the entire season.

Vine Crops.—Now, for the other crops. I have mentioned these few that will bear setting or planting before the frosty nights are gone. There is a certain list that will not do well if chilled or frosted. Among these are the vines—cucumbers, or melons or squashes. If they are even chilled they will be damaged, and will not make a first-rate crop. The same is true with our beans; they are very tender, particularly Lima; hence, we must be careful in planting those to plant as early as possible, but not too early.

Our sweet corn, you all know, will stand just about the same amount of cold that the common field corn will, although I don't think it is quite as ready to come up if the weather is very cold.

Early Crops.—In market gardening we want to bear in mind to get our crops not only good, but just as early as possible, for that is generally where the profit comes in. Let me illustrate this. A number of years ago, I had a crop of cucumbers that was very nice and very early. We had none in the market, with the exception of those coming in from the South. I put the price down just low enough to keep out the Southern cucumber, and keep the market myself, and for a week or ten days I was getting from thirty-five to forty cents a dozen for all we could pick and carry to the market. On one certain morning, some six or eight or a dozen growers came in with their cucumbers, and the price dropped from thirty to forty cents down to six or eight. In fact, the market broke all to pieces. I had already sold enough to give me a nice profit on my crop, while my neighbors who had been a week behind, scarcely got enough to pay for the picking and hauling.

You will find this to be true with regard to many crops and peculiarly so with early peas; those who get the first early peas will reap the profitable harvest.

Large Crops.—In speaking on this subject, I can only throw out a few of these brief hints, as my time is limited, and I will only say the rule is to get very large crops and to get them very early, put them up in the best possible manner, and then in marketing, to get just as near the consumer as possible. Do not throw them on the market unless it is

an absolute necessity, and if you do throw them, throw them on somebody else's market besides your own. If I have a surplus of any one thing that I cannot sell at home, and it is necessary for me to throw it on the market, I send it to Chicago and tell somebody there to sell it for what they can get, though we don't often have anything of that kind.

Discussion.

PROF. CHAMBERLAIN.— Where can you get two year old plants of asparagus?

MR. SMITH.— I think there is no difficulty in getting them; I think most nurserymen, growers, have them.

QUESTION.— Can't you get any good asparagus roots out of an old bed, six or eight years old?

MR. SMITH.— No sir. You can get roots enough, but the product will be small and spindling.

MR. HOXIE.— Isn't it quite an easy matter to raise them from the seed?

MR. SMITH.— Yes; but, of course, it takes time.

MRS. BARLOW.— You can get roots from Mr. Lovitt, of New York.

MR. TOOLE.— We can get them from Curry Bros., Milwaukee, and Hiram Sibley, of Chicago.

PROF. CHAMBERLAIN.— Have you any preference for variety?

MR. SMITH.—I have my doubts whether there is more than a single variety. My impression is that the so-called Conover's Collossal which I am growing, and the other varieties, are really the one old variety, grown under different circumstances, more favorable, of course. I have some coming on now from Paris, a variety of French asparagus, said to be the finest in the world. I don't know what it will prove to be.

MR. KELLOGG.— How much manure can you plow under?

MR. SMITH.—If it is fine manure, I can plow under seventy-five to one hundred loads to the acre.

PROF. CHAMBERLAIN.— One hundred loads wouldn't be half of one inch deep.

MR. SMITH.—If they are good large loads, I think they would. I would recommend to all farmers and all gardeners to have a good hand cultivator, and a good Mathew's seed sower. I find nothing equal to that.

QUESTION.—How late in the season do you cut your asparagus?

MR. SMITH.—Generally about the 10th of July, sometimes as late as the 15th, depending on how early we begin in the spring.

CAPT. PUTNAM.—In the discussion of this question, I see you ignore the onion.

THE CHAIRMAN.—The onion generally speaks for itself.

MR. SMITH.—That is a plant that should be sown very early in the spring. It needs damp, cool weather to get a start, but after it is started it will bear a great deal of dry weather, but it would be killed by a very early drouth. With cabbage, I have generally failed to get a very large crop, if I got my seeds in early.

MR. LOCKWOOD.—Is there any special fertilizer used on onions?

MR. SMITH.—I have found nothing equal to good barn-yard manure or a compost heap.

MR. LOCKWOOD.—I have raised a thousand bushels of onions to the acre, with sulphur as a special fertilizer.

MR. SMITH.—What did you put on the ground before you put on the sulphur?

MR. LOCKWOOD.—I put on plenty of the old stand-by, barn-yard manure, but I never succeeded in raising so large a crop of onions without special fertilizers. I put on to one-eight of an acre, seventy-six pounds, pretty highly seasoned. That field cost me just seven and a half

cents to the bushel for my onions, including the seed and the cultivation, and fertilizers, and they were marketed in Toledo, at fourteen cents a bushel.

MR. MORRISON.—To what do you attribute your great success as a gardener, Mr. Smith?

MR. SMITH.—A good soil, well adapted to the purpose, well drained, heavily manured and thoroughly cultivated, just as thoroughly as I could do it with my best knowledge of how to do it. I have been asked about manure. I will say I depend on the barn-yard manure, and the materials which go into the compost heap in the garden. I have some stock and we haul a great deal from the city, and we make a great deal from the refuse in the garden.

MR. TOOLE.—Is not your situation different from others as to having water below?

MR. SMITH.—We have to dig from six to fifteen feet, probably nowhere deeper than fifteen feet, perhaps not more than twelve.

MR. PUTNAM.—I want to ask Mr. Lockwood how he applies the sulphur.

MR. LOCKWOOD.—I apply it just as I sow the onions. Immediately on the preparation of the ground, sow the sulphur and sow the onions; sow it as we do landplaster on clover.

MR. SMITH.—For early potatoes, I prefer good wood ashes, to any barnyard manure we have ever tried, and I would put it on at the rate of fifty bushels to the acre, and even more if I could get it. I have never tried coal ashes, but chemists tell us they are not valuable. I sow the ashes broadcast. I have tried plaster but not with very good success. I do not find that it is of any value on my land of late years. A good many years ago, we used to use plaster quite successfully, but of late years, it don't seem to do much good. I don't know why it is unless it is that the ground being full of manure, it don't need it.

MR. BROWN.—It has been recommended in our part of the State for rot in potatoes.

MR HOXIE. — Anybody interested in this matter of special fertilizers, can get some light through Prof. O. E. Atwater, who has been making some experiments at the Connecticut College in that line.

RASPBERRY AND BLACKBERRY CULTURE.

By C. H. HAMILTON, Fond du Lac County, Wis.

Third Paper.

Berries and the Farmer.—In a country where 40 to 50 bushels of corn is nothing great to boast of, it is not singular that a few beets, onions, cabbages, a little lettuce and sweet corn, all indifferently attended to, make up the kitchen garden of the average Western farmer. Yet his wife and children are as fond of fruits as any other man's family. You will see them, when the season for wild raspberries and blackberries comes, roaming the meadows and prairies in quest of the early fruit. Anybody can raise beans, but berries, which are quite as docile under culture, are regarded with distrust. By many, these provisions for family living are regarded as rather small business, unworthy of serious attention, or as a silly disposition to be over-nice in self-indulgence.

Fruit Raising Elevating.—The care and cultivation of small fruits is calculated to awaken the best qualities of the mind. The work is instructive, pure and elevating in every way. The enjoyment of these fruits upon the table is elevating. Their beauty and flavor awaken pleasing emotions. They are provided by a bountiful creator, to minister not only to our pleasure, but to our health as well. They come to us at that particular season of the year when the human system seems to require just what they are able to impart. They come just at the right time, and are made to suit the season. There should be, and may be, fruit in every home, not merely in scanty supply, but in abundance; yet there are thousands of families that go without. The trouble, small as it is, seems too much for them.

Preparation of the Soil.—In the culture of the raspberry and blackberry, there is no particular difference in the preparation of the soil. Do not be afraid to apply a liberal coating of manure, and give a thorough and deep plowing. Pulverize the soil with the harrow, for the labor bestowed in its preparation is not work thrown away.

Planting.—Plant your raspberries in rows, seven feet between the rows, the plants two feet apart in the row. Procure good, healthy plants and, in planting, the roots must be spread and placed as near as possible in the way in which they grew. Cover the crown of the plant two inches deep, pressing the earth firmly around it.

Care.—The main care which your plants will need the first season is thorough cultivation, and that is not only to be done thoroughly, but often, with the cultivator and the hoe. The growth will not be as strong the first year as the second. The second year, as well as succeeding years, not only thorough cultivation is necessary, but care, that your bushes do not grow too high. Pinch the tops off all canes as soon as 18 to 20 inches high. After that let the laterals grow at will. In spring cut laterals back to within 12 to 15

inches of main cane. Remove all the old wood as soon as the fruit is gathered, and burn the same.

Possibilities. — While other industries of the state have made great advancement, and a feeling of pride has sprung up among our farmers, as they have compared notes with each other and seen the possibilities which lie before them; while our agriculturists are rejoicing in the changes which have been made, and are likely to be made, along the line of farming, can not we as horticulturists see great possibilities yet to be obtained in our line?

Small Fruits Improved. — While there have been great changes in our modes of cultivation, what great changes have been wrought in our lists of small fruits of recent introduction! Now we have that large and mammoth black raspberry, the Gregg, the almost iron-clad Souhegan, which ripens its fruit early and abundantly, and that strong and vigorous grower, the Ohio, which has proved so profitable for evaporating. Along with these are valuable kinds of red raspberries, which, with the blacks, give us a succession of fruits.

Laying Down.—Blackberries can be raised successfully and profitably with a small amount of labor. Protection by laying them down (for protection is a great barrier in the minds of many), may easily be accomplished by removing the earth from the side to which you wish to bend down your plant, and a small amount of earth from the side and under the crown of the plant to make room for it to sink into; thus you are enabled to bend the roots and not the canes, and, by having the plants in rows 7 feet by 3 feet in the row, they are near enough together so that when laid down, one rests partly upon the other and is easily covered. Two men in a day and a half or three days will cover and protect one acre, or in other words, insure you a regular yearly crop of from 140 to 175 bushels of this delicious fruit.

Eternal Vigilance.—But in the care and cultivation of these fruits, as well as with the strawberry, the dewberry currants, gooseberries and grapes, all which add to the pleasure and profit of the small fruit grower, do not forget to exercise a vast amount of Thos. Jefferson's price of Liberty—eternal vigilance.

Discussion.

MR. J. M. SMITH.—Would you cut the Greggs down as low as you say?

MR. HAMILTON.—Yes, I would clip them down to a foot and a half; that will raise them to the height of four or six inches.

MR. TRUE.—How many plants would you advise an ordinary man to plant?

MR. HAMILTON.—I think fifty blackberries will keep the average Wisconsin family supplied.

MR. TRUE.—What is the average Wisconsin family?

MR. HAMILTON.—From four to thirteen.

MR. TRUE.—What kind of blackberries do you recommend?

MR. HAMILTON.—The kind that is cultivated in my section is the Ancient Briton, and for dry weather, for all purposes, there is no better variety. The Snyder is somewhat earlier and is planted quite extensively.

MR. HOXIE.—The Ancient Briton in some parts of the state is called the Wisconsin Blackberry; the two are identical.

THE FARMER'S FRUIT GARDEN.

By GEO. J. KELLOGG, Rock County, Wis.

Fourth Paper.

Farmers' Families Need Fruit.—Every one of the farmer's boys, girls, baby and hired man need, and health demands that they should have, two bushels of strawberries, one bushel of raspberries, one bushel of dewberries one bushel of currants and goosberries, one bushel of blackberries, 120 lbs. of grapes, ten bushels of apples each and every year, and ten cans of preserved fruit for winter. How many of you supply your families with a pint apiece a week from June 1st to October 1st each and every year?

Didn't you, who have no strawberry beds, think and act as though one crate of fruit was all you could afford last year, and every year, for canning purposes? Now, which had you rather do, pay $25 for a generous supply of fruit or $25 to $50 in doctors' bills every year? The fruit tastes best to me.

A Fruit Contract.—Now, what are you going to do about it? I will enter into an agreement with you, and have your wife take one side of the contract. You are to furnish an acre, well manured, fitted and fenced, and $10 to the wife or children to buy plants, and you agree to pay them half price, say 5 cents a quart, for every quart of nice fruit they will raise for five years on that acre of ground. The family shall first be supplied with all they can use; after that you may sell the surplus, or let the wife have it for pin money. Let me suggest that this acre, to give the best results, run north and south, over a knoll 20x8 rods; that it be free from shade, well fenced from the chickens, manured with well rotted manure free from white grubs and weed seed, making the land able to produce 100 bushels of corn per acre; that it be well fitted by plowing and dragging as early in the spring as possible. If the ground is level, ridge it sufficient so that water will not stand on it in spring.

About Plants.—Now, a word about plants. If you want to make this a permanent garden, plant the west and north sides, six feet out from the fence, to grapes. For black, plant Moore's Early, Worden, Concord and Janesville; for red, Brighton and Delaware; for white, Lady and Niagara. These will cost from 5 to 25 cents each. Eight feet from the grapes (the rows running the long way of the garden, so that the horse may do most of the cultivating) plant a row of currants, gooseberries and pieplant.

Currants.—For currants, plant Red and White Dutch, White Grape, Victoria, Long-Bunched Holland and Fay's Prolific, any or all of these. Prices will be 3 to 5 cents each, except Fay which is higher; buy the best new variety.

Gooseberries. — Smith's, Downing, same price as currants, except this last novelty. I name this row of low-growing plants next the grapes, that the wagon may be driven over the row in drawing in manure.

Blackberries.—The next, third row, plant to blackberries — Snyder for early,

Stone's Hardy and Briton for late. Plant three feet apart in the row. These plants can be had at 1 to 2 cents each; don't buy of traveling men, at exorbitant prices, poor dead, worthless stock. Send direct to the nursery, then you can go for the man who fools you.

Dewberries—The best is Lucretia, for all soils. Bartell does well on clay. These can be bought from 1 to 5 cents each. Should be planted in the row.

Black Raspberries. — Tyler, Souhegan and Gregg, 1 to 2 cents each, for 5th row.

Red Raspberries. — Turner and Cuthbert, for 6th row, if you will keep down the suckers. If not, plant Shaffer's and Philadelphia. These reds cost ½c to 2 cents each.

I have mentioned prices of these plants that you may not be imposed upon, either by traveling tramps, or those miserable nursery-men. Prices of new varieties get cheaper every year.

Keep Up Fertility.—Now, we have in the varieties of fruit that will remain on the same ground as long as you will probably care for them. Don't forget to keep up the fertility, as these plants yield you fruit. Keep them clean and well manured; all of them will bear some the year after planting; some will not come to their best until four years old.

Culture and Treatment — Grapes. —I can give but few suggestions in the little time allotted me as to culture and treatment. Set the grape roots eight feet apart, and six to ten inches deep. Prune, or rub off, all the laterals and throw the growth into one cane. The first year, in November, cut it off eighteen inches above the ground and bend it up or down the row, and cover with earth. The following years train to one or more canes with spurs, and in November cut off three-fourths of all the new wood, lay down and cover. After the fruit is set, if you want to protect from birds, insects, mildew and rot, slip a small paper bag over the cluster and pin it about the stem.

Currants and Goosberries.— The currants and goosberries must be looked after early in the season, and when the currant worms first appear dust the leaves with fresh and pure white hellebore.

Blackberries.— Set the plants three feet apart; nip off the new shoots at three feet high, in June. In November loosen the earth about the plant and bend it in the root. Lay it over, up or down the row, always the same way, and cover with earth. In the spring remove the covering and get the earth out of the row or you will ridge the ground. Straighten up the plants, press the earth firmly about them, tie to a stake, or run one wire over the row 2½ feet up, and tie to that.

Dewberries.— The dewberries need covering in November with marsh hay. Lift them above it in the spring and leave the hay as a mulch. Be sure that there is no grass, clover or weed seed in any mulch you use in the fruit garden. Mulch everything liberally.

Black Raspberries.—The black raspberries can be easily covered, if you incline them all one way while they are growing. While they usually bear without, they will always do better with protection. Nip the new canes at three feet to form laterals and harden up the wood.

Red Raspberries—Are easily covered, except Shaffer's, which should be trained to one side like the black. Those red that sucker must not be permitted to grow too thick. Treat the young plants as weeds. Plant all these rows six to eight feet apart.

Strawberries.—Now, we come to the strawberry rows, and it is best to follow corn or potatoes with strawberry planting, if possible, thereby avoiding the white grub.

You want a square rod of ground for each member of the family, and about as many more for visitors and friends. If four rows across the garden will be enough, plant two of perfect flowering kinds and two of pistillates. Between two rows of one kind you will get pure plants for next spring's planting; so set 50 plants of a kind, 25 in each row side by side.

Varieties.—I will name for the perfect flowering kinds, Jessie, May King, Miner, Parry, Wilson and Mt. Vernon. Pistillates, Bubach, Crescent, Manchester, Jewel and Windsor Chief. From these you may select, or plant them all. You can have 25 of a kind at hundred rates and have early and late, large and small. If I could have but two they would be Jessie and Bubach; next May King and Crescent, next Wilson and Manchester. The first two are worth 4c., apiece; the others 1c., each.

Keep the Garden Clean.—Plant best kinds, and be sure you get plants pure and unmixed, and keep them so. Set a new bed every year; if the old bed does not get too grassy, leave it for 2d and 3d crops, but for the 1st., year after planted hoe that strawberry bed every Monday morning, just as sure as the washing is done. Keep the whole garden clean by frequent cultivating and hoeing. Cultivate shallow, but often; this is very essential in time of drouth, and after every rain.

Plant your strawberries 4 ft. by 1, 2 or 3 ft., as you choose, in the row, for matted rows. In hoeing train them up and down the rows. Keep picking off all blossoms the first year, giving the strength to the plants.

Large Berries—Mulching.—If you want fancy berries, a good many of which will fill a tea cup, plant two feet apart each way and keep off the runners. Don't hoe or cultivate about the strawberry more than a half-inch deep. In November if the matted rows are too thick, take a knife and cut out all the small and puny plants before freezing up. As soon as the ground is frozen one inch deep, cover the entire bed and paths with marsh hay, or cut corn stalks just so you can't see the foliage; don't put on too much. In spring leave the mulch all on, opening up if plants don't get through. This mulch makes a clean bed for clean fruit and protects in time of drouth. Hand weed what is necessary before fruiting.

Do not plant pistillate varieties alone. While set beside perfect flowering kinds, they are the most productive of any. Every strawberry catalogue should be marked so that you may know which are pistillate and which are not.

Successful Returns.—In summing up this question of small fruit, I will name some instances of successful returns with good culture:

C. Rouse, of Iowa, 1886, with Crescent, Wilson, Manchester and Sharpless, from 16 rows, 29 rods long, picked 3030 qts., which is 26½ qts., per square rod. This was a dry season.

Thos. E. Root, of Illinois, 1888, 1⅛ acres of Crescent and Miner, set 3½ ft., picked 2,500 qts., 31¼ per square rod.

Jewell strawberry, in 1885, gave 80 qts. per square rod, Bubach, in 1885, gave to one boy, in two hours' picking, before breakfast, 72 qts. One hundred Crescent plants, the following year, yielded 500 qts. of fruit, while one picker, at Minneapolis, picked 239 qts. of Countess in one day.

B. S. Hoxie, of Evansville, in 1886, had 112 qts. from a patch 16x24 feet, 37⅓ qts. per square rod.

W. T. Scott, Boscobel, in 1885, from 90 rods took 126 bu., 1⅓ bu. per rod. These were Crescent and Wilson.

Levi Chase, Madison, Wis., grew over 4 bu. per square rod of Wilson, Crescent and Winder Chief.

J. C. Jenks, Janesville, when Wilson did better than now, grew 4½ bu. on 1 square rod, and Mr. J. F. Morse, the same year, grew 5 bu. per rod.

Mr. Loudon reports Jessie in hills as yielding 600 bu. per acre.

Now, there is no need of any one who has a spare rod of ground doing without strawberries. The returns of black raspberries are from 3 to 8 qts. per hill in favorable seasons, and blackberries yield equally as well, while red raspberries yield about the same to the square rod, and grapes from 10 to 20 lbs. per vine, each year, and many bunches of grapes will fill a market basket.

A Good Mixture.—Mix brains, common sense, muscle and manure in the right proportion, and you can raise anything the soil will produce, and in quantities according to the mixture you apply. Do not expect "grapes of thorns or figs of thistles," although I have seen splendid Jessies where the thistles prevented the picking of the fruit.

Requisites for Success.—Good soil, well drained, rich in composts, free from weeds and white grubs, good kinds, true to name, well planted, well cultivated, properly protected, in ordinary seasons will pay a wonderful per cent. on all the investment, and you can have strawberries that you can cut with a carving knife. Of course you must look out for the leaf roller, crown borer, thrip, white grub, and a host of other pests. Mow the strawberry beds right after fruiting, and to destroy these leaf-eating insects, burn when there is a brisk wind, for in a dry season it may injure the beds.

The leaf-eating insects of any plant or tree may be easily destroyed by white hellebore, London purple or Paris green, when the fruit is not maturing. We can't have anything without some sweat, and sometimes a good deal. Every plant, shrub, grain, fruit, vegetable, grass, tree in the forest, and fruit tree, from the time of the garden of Eden till now, has its peculiar enemy, and man is not an exception, for woman is after him and the devil is after them both.

Apple Growing in Wisconsin.

Why it is Unsuccessful.

1. We plant on low, black soil, undrained or unridged, or on the south and southeast side hills. We should plant on the top of clay timber ridges, north and northeast side hills.

2. We have been planting for forty years the tender or half-hardy sorts, and too large trees.

3. We neglect to prune the tree to one central trunk, with only side branches at nearly right angles 86 inches apart.

4. We do not shade the bodies from the day of planting to protect from the borer, and the heat of the sun, summer and winter.

5. We too often neglect to fence, and often the cattle do the pruning.

6. We often grow them too fast and too late in the season, especially for the first six or eight years. Do not stimulate to growth after the 1st of July.

7. We starve them to death after they come to bearing.

8. We do not protect from our insect enemies by spreading with poison after blossoming in spring and early summer.

9. We often let our trees overbear, and thereby injure the vitality of the tree, and if this is followed by a hard winter the tree is injured and often killed.

10. Because of hard winters—more because the foregoing precautions have been neglected than the necessary injury by cold.

In order that the severity of the winters may be understood, I herewith append a synopsis of the past fourteen winters, with a more extended report of this winter just closing:

The record below was taken on the north side of a hard maple tree with a Farenheit mercury thermometer. Only such days are given as went to zero and below, including also November and December, 1887:

November, 1887.

November 28th, 6 below zero.

December, 1887.

December 22d, zero; 24th, zero; 28th, 12 below; 29th, 16 below; 30th, 19 below. Five days at zero and below aggregated 47 degrees.

January, 1888.

January 2d, 8 below; 3d, 15 below; 9th, 2 below; 10th, 10 below; 11th, 18 below; 12th, 12 below; 13th, 12 below; 14th, 22 below; 15th, 27 below; 16th, 30 below; 17th, 10 below; 18th, 20 below; 19th, 10 below; 20th, 15 below; 21st, 30 below; 22d, 17 below; 24th, 9 below; 26th, 5 below; 28th, 10 below. Nineteen days at zero and below aggregrated 282 degrees.

February, 1888.

February 6th, 7 below; 7th, zero; 8th, 21 below; 9th, 27 below; 10th, 21 below. 11th, 18 below; 15th, 10 below; 16th, zero, 26th, 7 below; 27th, 12 below; 28th, zero; Eleven days aggregated 123 degrees.*

To the first of March for the past winter, thirty-six days at zero and below aggregrated 468 degrees. We hope we have passed most of the zero weather for this winter.

The following figures will give the comparison for the past thirteen winters:

Winter of 1874-5 gave 47 days below, aggregating 742 degrees.

Winter of 1875-6 gave 14 days below, aggregating 120 degrees.

Winter of 1876-7 gave 40 days below, aggregating 418 degrees.

Winter of 1877-8 gave 4 days below, aggregating 22 degrees.

Winter of 1878-9 gave 28 days below, aggregating 386 degrees.

Winter of 1879-80 gave 15 days below, aggregating 106 degrees.

Winter of 1880-1 gave 52 days below, aggregating 606 degrees.

Winter of 1881-2 gave 11 days below, aggregating 61 degrees.

Winter of 1882-3 gave 47 days below, aggregating 597 degrees.

Winter of 1883-4 gave 33 days below, aggregating 371 degrees.

Winter of 1884-5 gave 52 days below, aggregating 669 degrees.

Winter of 1885-6 gave 27 days below, aggregating 273 degrees.

Winter of 1886-7 gave 38 days below, aggregating 449 degrees.

The coldest month in thirty-two years was February, 1875. Twenty days below zero aggregated 324 degrees. The coldest days during the last fourteen winters were as follows:

Winter of 1874-5. January 9, 30 below; 1875-6, February 2, 17 below; 1876-7, January 25, 30 below; 1877-8, January 7, 15 below; 1878-9, January 2, 33 below; 1879-80, December 18, 26 below; 1880-81, January 10, 37 below; 1881-2, January 23, 14 below; 1882-3, January 21, 36 below; 1883-4 January 5 and 6, 35 below; 1884-5, January 22 and 28, 30 below; 1885-6, January 23 and February 3, 28 below; 1886-7, January 7, 37 below; 1887-8, January 16 and 21, 30 below.

Discussion.

MR. WEST.—What pruning do you give your currant bushes?

MR. KELLOGG.—Take out the old wood after three years old; renew the bush continually from year to year. The black currant might need nipping on the shoots after a season's growth.

MR. J. M. SMITH.—How does Fay's Prolific do?

MR. KELLOGG.—It is paying very well. It is a large, late variety, similar to the

*March, 1888, has given but one day below zero, that was 22d, 8 below, making the average 476 up to March 27.

old cherry currant in size, but much better in yield. I would trim out the old wood from blackberries in the fall; if I were trimming for shortening in for fruit, I would trim off any time in June after the growth has made one foot.

MR. SMITH.— Why do you recommend so many kinds of strawberries?

MR. KELLOGG.— There are a great many different tastes, and you can have a dozen varieties of strawberries at the same price you can have one or two kinds.

QUESTION.— Have you for sale the Janesville grape?

MR. KELLOGG.—Yes, and it is good for everything but to eat.

MR. SEYMOUR.—It seems to be ripe the earliest and the latest of any grape produced, and it may be good to eat under the impression that it is a new grape imported from France, but I think it is good for nothing except as a windbreak.

QUESTION.— Isn't it good for preserving?

MR. KELLOGG.— The best way to preserve grapes is to sit up nights and eat them.

QUESTION.— I would like a remedy for the currant borer?

MR. KELLOGG.— The best remedy is the knife and the fire; cut out the old wood and burn it.

POTATO CULTURE.

By KENNEDY SCOTT, Columbia County, Wis.

Fifth Paper.

Kind of Soil to Select.—The kind of soil to select is a very essential element in the success of potato culture as well as in any other crop, and I think more essential in this than in most others. While in nearly all other crops, good land in good condition will produce an average crop, it is not so with potatoes. It is necessary to have what is generally styled with us *sandy loam*, and that in good condition. After it has been seeded down to clover, give it a good coat of barn-yard manure, about 25 loads to the acre, plow early in the fall, and in the spring thoroughly cultivate till it is well pulverized to the depth of four or five inches, and well smooth with a smoothing harrow.

Marking the Ground.—Now it is ready to be marked, which I do one way with an ordinary marker making four marks, three feet apart. To mark the other way we take an ordinary sulky corn plow; taking off one foot from each side, fix the others stationary with rod holding them just three feet apart, furrowing across the marks to the depth of at least four inches. I have obtained best results from planting that depth, using an ordinary tracer to assist in getting rows straight and of equal width. The planting to this depth is necessary for two reasons—it puts the seed deep enough into the ground so that we may get the full benefit of thorough dragging before the young plants make

their appearance above ground, and again just as they are out of the ground. This should be done with a Scobie harrow, or some other slanting tooth harrow. I have never found one that does as well as this. Second, I find if the seed is not put into the ground from four to five inches deep that we have a great many potatoes that grow out of the ground and become sunburned and hence good for nothing but feed or seed.

Preparing the Seed.—Selecting and preparing the seed should be done with a great deal of care, as upon this, in connection with planting, to a certain extent, depends the difference between a good paying crop and an average or poor crop; if the seed fails in 1-15 of this it will reduce the yield at least 12 bushels per acre. On an average crop this is too much to lose. The seed should be taken from medium sized, smooth potatoes; first cut the seed end off and throw away, then cutting the pieces so there will be two eyes to the piece. This should be done on wet days, or if extra help has to be hired, it is best to hire women to do this, as there will be quite a saving in expense, and the work will be as well done. Seed should be cut a few days before planting on account of becoming damaged from being kept in a pile. If kept any length of time should be put in bushel boxes.

The planting should be done by having a boy drop potatoes by going across the furrows, putting one seed in a place, and a man follow up and cover with a hoe. As to time of planting, it is best to plant as early as we can immediately after putting in the small grain, as it gives the tubers the best part of the growing season for development. While some think late planting makes less trouble to fight the potato bugs, give *me* the early planting.

Cultivation.—The cultivation should begin just before the plants make their appearance, with a slanting tooth harrow, as stated above, and do not be afraid to give the ground several thorough draggings at different times till the potatoes are all up. Then put a fine tooth single horse cultivator at work, and you need not be afraid of overdoing this part of the work, for the ground should be stirred immediately after every rain to prevent the starting of weeds; at least it should be cultivated twice each way with this tool, as by this means you can ripen the crop from 5 to 10 days earlier. The hilling should be done, just as the vines are in full bud to blossom, with a single shovel plow with wings on, going both ways.

Fighting the Potato Bug.—The most important thing in this latitude is the fighting of the potato bug, which we do with Paris green mixed with land plaster. Take a good box, about the size of a boot and shoe box, or a little deeper, cut and fit pieces of inch boards about an inch square in the inside of the box every ten inches, making them reach across the same, and fasten by driving a nail from the outside into each end (not putting cross pieces directly under each other). Then fit a cover on with hinges, and fasten with clasps, to keep shut. Tack narrow pieces of cloth on edge of box to keep plaster from sifting out. Find center and put hole through shortest way on which to revolve the box, by putting crowbar or any iron bar for axle. Nail two crotched sticks to pieces of timber 8 by 8 inches, making them of sufficient height to let the box revolve when hung on bar in these crotches. Then put half the plaster that can be handled in box, putting Paris green in at the rate of 12 to 14 ounces to the hundred weight of plaster. For example: If your box

wil handle 100 lbs. (and this is about the right size), put 50 lbs. plaster and spread over this 6 or 7 oz. Paris green; then add 50 lbs. more plaster and 6 or 7 oz. green. Shut box cover tight, revolve about ten times, and your compound is ready for use, well mixed.

As everyone does not have scales, we usually have a small can that will hold a pound of green, as a measure, and as our plaster comes in bags of 200 lbs., it is not much trouble to get along. In putting it on the potato vines, we carry it in pails and scatter over the land. I have used a small tin can with bottom punched full of small holes, but think it does not pay, as I find when I use plaster most bountifully, have always had the best crop. Two men will mix and put on 500 lbs. in a day. This should cover ordinarily about 2 or 3 acres according to the condition or growth of vine and amount of bugs. The mixture should be applied when the young bugs are nicely hatched out. After waiting a few days it is generally necessary to go over the patch and put some on the hills where the bugs have hatched; this will have to be governed by circumstances. But we are satisfied that the increase of crop, when plaster is used, will more than doubly pay for same, and time of putting it on.

Harvesting.—In harvesting, we dig with six-tined forks. We go over the ground and first pick up the merchantable potatoes and put them in boxes made of lath with board ends; inside measurement 12 inches deep, 16¼ inches long, and 14 inches wide, which hold an even full bushel, haul them to a pit, or, better still, to a building and store till time to sell. Then we pick up the small ones in the same way and take to the cellar, and, during stormy weather, and in the winter, we look them over, getting out those fit for house use and seed. The very small ones we keep for feed for stock in the fall and winter; I think they are worth 15 cents per bushel, with a grain ration.

Cost of Cultivation.—The cost of cultivation and marketing I find as follows:

	Dr.
To rent of one acre	$4 00
To prepairing and marking	2 00
To planting	1 50
To puting on plaster	50
To plaster, 250 lbs. at 45 cts	1 12
To Paris green, 2 lbs. at 25 cts	50
To dragging and cultivating	1 75
To harvesting, 100 bu. at 3½ cts	5 95
To 5 bu. seed and cutting same	1 75
To marketing 100 bu., 1½ miles	2 50
Total	$21 57

	Cr.
To 100 bu. at 38 cts	$38 00
To 50 bu. at 20 cts	10 00
To 20 bu. small at 10 cts	2 00
Total	$50 00
Less expense	21 57
Profit	$28 43

This 170 bushels to the acre is not over an average crop, nor is the price, 38 cts., above the average for a series of years, as I have aimed to give facts, not any fancy drawn theories. While this year, in the vicinity of my home, some crops, or at least one, were sold that brought $90 per acre as gross receipts, yet this was the best crop, I think, in the county. Others brought from $20 to $60, the extra price making up the deficiency in yield.

Varieties to Raise.—As to kinds to raise, select some single standard variety and raise this; it will give the best results, as most farmers have not the conveniences to keep separate several varieties; leave the experimenting to the Experiment Station (which is doing grand work for the farmer of this state), or to seed-men, who are making a business of this work. The farmer who raises but one variety can always sell to better advantage, especially if he should have a car-load. If a less amount, if it

be a standard variety, the buyer can afford to pay more, for he can go out and buy a car-load of that variety, as straight car-loads sell to better advantage in the general market. Again, the farmer who raises enough to have a car-load to sell, can bring the local buyer to pay what the market will afford, or ship himself. This year I know a single instance where a man was offered 25 cents, and plenty was being purchased at that price, while the party who had a car-load, shipped to a reliable commission merchant in Chicago and *net returns* gave him 61⅔ cents. But in order to get this fancy price, you must select or assort closely, not being afraid to take out the small ones, as the consumers in the cities will not pay for them. Then make a car of second sortings and ship these, and they will sell to good advantage.

The Industry Growing.—I have spent some time to ascertain if this industry is on the increase. For this purpose I have consulted the depot agents at the following stations, and find for 1882 and 1887 the number of car-loads to be as follows:

	1882.	1883.
Wyocena	..	7
Doyelstown	10	20
Rio	12	23
Fall River	51	51
Total car-loads	73	101

Estimating a car-load at 400 bushels, we have 40,400 bushels, and estimating the average price last fall at 60 cents, we find the value of potatoes sold as above to be $24,240. Has there been any other same number of acres of land, with an equal amount of farm labor, that have produced anywhere near this amount for one crop?

EXPERIENCE IN POTATO RAISING.

By MATT ANDERSON, Dane County, Wis.

Sixty Paper.

No Rule Certain.—Although I have been growing potatoes in a small way for 40 years, I must confess that I cannot give any certain rule or process whereby I can be certain of raising a good crop every year. I have experimented in various ways of planting—in planting large potatoes whole, in cutting in small and large pieces.

An Experiment in Ohio.—About 40 years ago, in Ohio, I planted ¼ of an acre in potatoes. The lot was 220 feet long and 50 feet wide. Through the center of that lot, lengthwise, I planted one row of large, round potatoes, whole; on each side of that row I planted the seed end of large potatoes, the potatoes being cut in two; did not plant the stem end. The rest of the lot was planted with the same variety of potatoes, cut to two or three eyes in a piece. The row planted with whole potatoes produced one-fourth more and larger potatoes than any row planted with cuttings of two or three eyes, and one-eight more than the rows that were planted with the whole of the seed end. This lot of less than ¼ acre produced 73 bushels.

Planting Whole.—Since that time I have frequently planted large and

medium sized pot atoes whole, with good results. I would not plant long potatoes whole, as they would grow too many tops; but round potatoes grow tops only from the seed end when planted whole. In planting large potatoes whole, I plant from two to two and one-half feet apart in the rows, while in planting small seed, I plant from 12 to 18 inches apart, rows three to three and one-half feet apart. Early potatoes that grow small tops can be planted closer than varieties that grow large tops.

To Grow a Good Crop.—To grow a good crop of potatoes we must have good land, good seed, and good culture. I have raised a good crop by planting in a field that was an Alsike clover pasture for two years. The seed was dropped in the furrow close to the land side, every third furrow; the furrows, 13 inches wide, I plowed about four inches deep. About the time the potatoes began to come up, I harrowed thoroughly, and when one foot high, cultivated with a three-shoveled iron cultivator, then ridged up high with a horse-hoe with wings on. That year my neighbors' potatoes that had flat culture rotted badly. It was a wet season; my potatoes were saved by the deep furrow between the rows, thus preventing the water from sinking around them.

Method of Planting.—My usual way of planting potatoes is to plant on land that had been in corn the previous year, on clover sod manured before plowing for corn. I plow the stalks under about seven inches deep. I have a three-row corn marker made of 2 by 8 inch plank, runners three feet long sharpened on the underside. A man rides on it, and if done soon after plowing, the marks will be deep enough to drop the potatoes in; I cover with a three-plank slicker, the man riding on it and going over the ground both ways. Sometimes I use a smoothing harrow to cover with.

Cultivating.—I do no more work until the tops begin to appear; then harrow so as to kill all weeds, and cultivate with sulky cultivator when 8, 10 or 12 inches high, using horse hoe with wings on to finish. I have no time to use a hand hoe or pull weeds. Foxtail grew last year after we finished cultivating, yet I had a good crop of potatoes for so dry a year.

Fitting the Land.—My land is rolling prairie; good corn land, with a porous clay subsoil, of a brown color. Last fall I began to plow a cornstalk field for potatoes. The land had been in Alsike clover for two years, then manured and planted in corn last spring. This field I plowed with a three horse new deal plow, about 7 or 8 inches deep, and followed after with a subsoil plow, loosening the ground in the bottom of the furrow from four to five inches deep, as I believe in planting potatoes shallow. I expect to have plenty of loose soil under the potatoes, which I think will be of benefit whether the season is wet or dry.

Varieties. — For information on this subject, I refer you to Professor Henry's late bulletin. You will find more truthful information in it in regard to varieties than you will in all the advertising catalogues. If a man has any respect for his character for truth and veracity, he had better not recommend any one variety as being better than all others. Yet I am in favor of experimenting with new kinds and of changing to the best. It is better to lose a few dollars in obtaining new seed than to plant varieties that are run out. I sent five varieties of potatoes to my present farm from Ohio (28 years ago) before I moved to it, and was ridiculed by those then living on it. Among those varieties was the Peachblow, which proved one of if not the very best potatoes in its day. A variety in a dry season and on good potato soil

may be mealy, and quality first-rate. In a wet season or on wet land, or if not ripe, it may be unfit for table use. I believe in planting early. I have early Ohios, Early Harvest, May-Flower and Clark's No. 1, which I think are as good as any I have for early. I have bought four new varieties this year, and intend to get such as are recommended by reliable growers.

Digging and Marketing.—I dig with a common-sense digger; I am in hope of getting something better, as the objectionable part of the business is the picking. I sort in the field, putting small ones in bags and the large ones in wagons. If there is a market near home, sell at home; if not, ship to the best market. It costs as much to haul potatoes on a wagon 15 miles, as it does on the cars 150 miles. I have seen a statement that it requires about 10,000 bushels of potatoes a day to supply the Chicago market. The demand for potatoes, within the last few years, has increased more than for any other crop the farmers produce. Therefore we may expect a market every year for an average crop of potatoes. If each family of five persons in the United States consumed four quarts of potatoes each day, it would require 480,000,000 bushels a year. This year hundreds of thousands of bushels of potatoes have been imported to this country. You can see foreign varieties of potatoes quoted in the Chicago market. Canada, Nova Scotia and New Brunswick, can, and would supply the Eastern States with potatoes, if it were not for the duty of 15 cents per bushel.

Killing Potato Bugs.—I want to say something in regard to killing potato bugs, as I have a different plan for killing them from my friend from Rio. I have a pair of trucks, such as we used to use under threshing machine powers. I have two kerosene barrels that hold fifty gallons each. I have taken two pieces of inch hose, one seven feet and one six feet, and secured each of them into the bottom or the side of the barrel, or rather fastened them to an iron spigot in the barrel. At the other end of the hose, I have adjusted the rose of a common sprinkling can. I fill those barrels with water, and I sent to New York for London purple which costs ten cents a pound; I put that into the water, and one man sits behind and another in front, straddling a barrel, and they can sprinkle two rows of potatoes as fast as your horse can walk. I find this better than the Paris green, and it won't blow away or injure the plants. Arsenic is about the cheapest thing, but it requires a great deal of care.

Discussion.

MRS. BARLOW.—We have what I call an improvement on the methods suggested by both gentlemen, for destroying potato bugs. We have an old cart attachment, such as is used for sprinkling the streets, and one man and a team can sprinkle four to six rows at a time, and it works first-class.

MR. ANDERSON.—I should think you would sprinkle more on the ground than on the potatoes.

THE CHAIRMAN.—That could be regulated by perforating in rows.

MR. JACOBS.—I would like to know if there is any remedy for the scabbiness of potatoes.

PROF. CHAMBERLAIN.—I don't think we have had any real light in regard to that. We can tell the nature of the scab, but what brings it we don't know. Sandy land produces it much less frequently than a richer clayey land. Furthermore, fresh manure, not properly mixed through the soil, produces scabbiness, but I don't know of any way to

relieve potatoes from scabbiness in a wet season.

MR. TOOLE.—What is the proper mixture for Paris Green?

PROF. CHAMBERLAIN.—Fourteen ounces of Paris Green to one hundred pounds of land plaster, putting fifty pounds of land plaster in a box, then spreading over it seven ounces of Paris Green, then do the same thing over again.

MR. LOCKWOOD.—I made an experiment in fertilizing potatoes some years ago. I put on so many rows and plow under green manure, then on so many more rows I put manure scraped up the summer before. Then on so many more, I put rotted sawdust. My idea was to find out a little about this scab. I found where the green manure had been put on the scab was very bad. Where the ground had been manured the year before, the scab was less, but bad, but where the rotted sawdust was put on, the potatoes were just as clean as could be, not a particle of scab. If we will make such experiments, I think we will find them valuable.

MR. PARKES.—Why do you plant in rows instead of hills?

MR. ANDERSON.—I think I can raise more potatoes to the acre. I think it is much quicker done and digging with the common sense digger, I think you can dig faster. I don't give my potatoes as much work as some people; I don't think it is necessary if you do it at the right time. I commence just as soon as I can. Last year I planted about the 12th of April and planted about twenty acres before I quit, and I certainly had the best crop of potatoes in my section—something over one hundred bushels to the acre, but I did not give them any extra cultivation whatever. In dropping the potatoes in rows, my men carry a sack around their neck, and their instructions are to drop a piece of potato and put their foot on it. Then I put on a slicker, which passes both ways and covers them very quickly, and don't think I could cover them that way if they were planted in hills. I ridge them up. I have tried flat culture, but have not done as well as on shallow culture.

MR. LOUIS.—I have followed Mr. Terry's mode of planting in five or six inches on sandy land, and I raised one hundred and forty-seven bushels to the acre by flat culture. It adds to the cultivation, because we can drag them longer and keep them cleaner.

MR. ANDERSON.—In a dry season, I think flat culture will do, in a wet season, I think they will rot.

MR. MILLS.—I would like to ask Mr. Scott why he cut off the seed end of his potato and threw it away?

MR. SCOTT.—The reason is that there are too many eyes in that part of the potato, and hence, will give too many stalks, which will throw out roots and bring forth potatoes making many smaller ones.

MR. MILLS.—A good many years ago, one year potatoes were very scarce, and we had to buy them and pay from $1.75 to $2 a bushel. I cut off all the seed ends of the potatoes that I laid in for the winter, and we ate the rest of these. In the spring I planted the seed ends, and I had the largest field of the most even potatoes that I ever raised in my life.

THE CHAIRMAN.—I think I can tell a bigger story than that. A few years ago, when potatoes were very scarce in our county, the potato parings around the hotel were picked up, and from them we raised potatoes that, I think, weighed four pounds, some of them.

MR. URQUHART.—Speaking about potato scab, I have been for several years,

troubled very badly with it. My land is rather a heavy clay loam. A year ago last spring, after the ground was well prepared, I happened to have two bushels of air-slacked lime. I sprinkled that pretty freely over the ground and raised the best potatoes that I have for many years. Of course, I don't know whether the lime had anything to do with it.

MR. KELLOGG.—I would like to know if leached or unleached ashes will help potatoes, and if so, how much?

MR. J. M. SMITH.—If I used unleached ashes, I would put it on at the rate of from fifty to seventy-five bushels to the acre, and about double that amount where we have leached ashes; there isn't much danger of putting on too much. In regard to cutting off the seed ends and throwing them away, last spring I saved a bushel of the seed ends and planted them by themselves, right in the middle of the piece of two or three acres that I was planting, and I found that when we came to dig them, the yield was just about the same, and the potatoes about the same size. But those coming from the seed ends were nearly a week earlier than the others.

MR. LOCKWOOD.—Having tried the experiment for seven years, I find the seed end invariably produces an earlier potato.

GRAIN RAISING.

By GEO. C. HILL, Fond du Lac County, Wis.

Seventh Paper.

A Sentiment Against It.—One is almost at a loss to know why information is called for on this subject, when it is well known that the growing sentiment of our best farmers, and indeed of the whole State, is away from this industry. But I have thought that in the race for the front, to which our Farmers' Institutes are so swiftly rolling us, our sagacious driver, the Superintendent, is becoming a little anxious about his impetuous leaders, and is lightening up the breeching and turning on the brakes. So what we have to say may be taken as hold-backs. And if our friends of the silo and dairy find it convenient to take a short nap, or suddenly remember that they have an engagement out, they will be perfectly excusable, even if we are left to raise grain to empty seats.

Comparative Values.—We still find a large portion of our farmers who are in the hold-back line. They cannot get over the idea of selling their farms by the bushel. But if wealth will not tempt them to a better plan, the want of it will soon drive them to it, or they will be driven from the field. A few figures will show the comparative value of the grain product with that of live stock, in Wisconsin, for the year 1885: The value of the wheat product was, $13,928,000; corn, $12,576,000; oats, $11,008,000; bar-

ley, $5,255,000; rye, 1,034.00; buckwheat, $230,000. Total value of grain $44,031,000. The value of the butter product was $5,850,402; cheese, $2,984,813. The value of beef product was $5,981,488; hogs, $10,323,776; mutton, $793,018; wool, $1,337,088. Total value from live stock exclusive of the horse, $27,270,585. Excess of value of grain product over that from live stock, $16,760,415.

Of all the agricultural products of the State in 1885, the wheat crop was the most valuable, worth $13,928,000. If for every twenty bushels of wheat, there grew one ton of straw, there were 1,000,000 tons, worth $2.50 per ton, making a total value of $16,428,000.

Average Yield Per Acre. — The average yield per acre reported for the United States was 10.5 bushels. The average for Wisconsin the same year was 17.2 bushels. This shows a high comparative average.

Objection to Wheat Growing.— The great objection urged against wheat growing is, that it is a crop which is sold off the farm, nothing but the straw being retained. A crop of 17 bushels of wheat takes from the acre of soil 18½ lbs. nitrogen, 8 lbs. phosphoric acid, and 5½ lbs. potash, valuable substances worth $3.75. A ton of wheat straw takes 9½ lbs., nitrogen, 5¼ lbs., phosphoric acid and 11½ lbs., potash, worth $2.50. But the wheat straw is a useful product on the farm, and to have a supply of it, is one of two reasons why some of us continue to grow wheat; with its use stock can be kept clean and comfortable, besides being useful as an absorbent, Grain straw is also utilized by many of our farmers for feeding purposes. If properly fed in connection with other feeds, it is said to be worth 70 per cent. of that of best hay. It has become of so much importance, that it is saved and stacked with more care than formerly. It used to be the plan to fill our barns with harvested grain. At threshing time, the straw was run out and piled in the barnyard. A better way is to stack the grain near the barn and mow straw in the barn, direct from the machine.

Winter Wheat.—I believe that on many farms, winter wheat can be grown with better results than spring wheat. I commenced to grow winter wheat, of the Fultz variety, in 1883, and have had five successive crops, with an average yield of 30 bushels. The yield for 1885 was 47 bushels. That for 1887 was 25 bushels. I believe almost every farm has some land on which winter wheat can be safely grown. A gentle slope to the east, free from knolls or ridges where the snow will blow away, or hollows where the water will settle, is a good location. If with these conditions, the field is skirted with timber on the west, it is still better.

Sow Clean Seed.—If the soil is properly prepared before seeding, it is best to sow the seed broadcast. This method prevails among many who have had experience in the use of both the drill and seeder. For spring wheat we prefer the hard varieties of Fife. The Saskatchewan has given good satisfaction. Whatever variety is grown, clean seed should be planted. Cockle and chess are more than worthless. If a man sows wheat he will reap wheat, twenty fold. If he sows chess he will reap chess, a hundred fold. This fact has been proved to me, and I am prepared to prove it to others. But I am sure this intelligent company of old farmers will not question the statement; yet, I find this old theory of wheat producing chess about as hard to eradicate, as it is to get all the chess out of the seed wheat.

Seeding With Clover and Grass.— The second reason for growing wheat is,

that it is one of the best crops with which to seed with clover and grass. If with winter wheat, the seed is sown as early in the spring as the fact of the living condition of the wheat plant is ascertained. After a light snow in April is a good time. The wheat crop will mature in July, after which the clover and grass will have a long season to possess themselves of the soil, while the stiff stubble makes a good protection during the first winter.

System of Rotation.—In my system of rotation the oat crop follows the grass, meadow or pasture. The sod is turned over in the fall, and in the spring can be worked up in fine condition. Our average yield of oats, on sod, has been from 50 to 60 bu., going as low as 25 bu. in a season of drouth, and as high as 70 bu. in favorable seasons. The White Schonen is found to be one of the best varieties. In Bulletin No. 13, Wisconsin Experiment Station, is a table giving the yield of 27 varieties of oats for a number of years past, at the Station. The average yield of all the varieties was 50 bu. That of the White Schonen was 50¾ bu., being exceeded by only one variety, the White Australian yielding 60½ bu. The report says: "No variety has yet been found superior to the White Schonen in productiveness, strength of straw and thinness of hull."

Oat Crop For 1885.—The oat crop of Wisconsin for 1885, was 43,000,000 bu., valued at $11,008,000; with this crop were produced about 1,000,000 tons of straw, worth $3.00 per ton. The average yield was 34½ bu. The average for the United States, for the same year, was 27½ bu As a State we should not be satisfied with our low average. We should aim at nothing short of 50 bu. It is a fact, however, that a good deal of low, wet land, not in condition for any crop, is annually sowed with oats, often as late as the middle of May. The crop is a little rusty straw, and a few bushels of oat hulls. To grow a good crop of heavy oats, it is necessary that the seed be planted as early in the spring as the season will permit, and on land that is in condition to grow other good crops. As to the wet land let it "go to grass," until it can be got into condition for early planting.

Feeding Value of Oats.—A crop of oats draws from the soil fully as heavy as a crop of wheat, but as both grain and straw are consumed on the farm, it is a good crop to grow. Still it is a question, whether we can afford to feed so many oats on the farm. A ton of oats is worth in the market, $20. We will suppose this to be its feeding value. With the $20, could be purchased 2500 lbs. of bran or middlings, which, according to a table in Hoard's Dairyman for March 2nd., is worth $27 to feed, while the fertilizing value of the non-utilized portion is worth more than double that of oats. The same reasoning would apply to the wheat crop, so far as to the disposition of the crop. The 17.2 bu., is worth in the market $12.90. This would purchase 1720 lbs. of bran or middlings, worth to feed $18.92 on the above basis, and still leaving a manurial value on the farm of above $10.

The Corn Crop.— After the wheat crop of our state, the corn crop is of the next greatest value of any of our agricultural products, being $12,576,000. Here, again, we are dissatisfied with the low average yield of 34.5 bushels per acre, although we find a crumb of comfort, on the principle that misery loves company, when we compare the yield with the average of all the corn-states, 27.5 bushels. The year 1885 was a good corn year in this state. Our own crop was 70 bushels, with three loads of pumpkins and two loads of cornstalks.

Barnyard manure and good cultivation will do it. On our farm corn follows the oat crop. On account of the excellence of the fodder I grow a variety of Yellow Flint, which was originated on our farm, and has been grown there for twenty-five years.

Rye and Buckwheat.—Of the growing of rye and buckwheat, I have had very little experience, and have never grown a bushel of barley in my life, and never shall, so long as the brewers monopolize its use.

Details.—Of the details of grain-raising, preparing the soil, seeding, cultivating, harvesting and marketing, there seems to be no need of discussing here. The best methods are well known. There is improved machinery adapted for every part of the work.

To the farmers of Wisconsin I say, First: Grain raising is not recommended, except in connection with stock growing.

Second: Strive to produce large crops, maintaining, our yield high in the scale with other grain-growing states.

Third: make the most profitable use of the crop after it is grown.

Discussion.

MR. URQUHART.—Do you get better results by sowing oats on the sod than by planting corn? Wouldn't you get better results by planting corn on the sod and then planting small grain afterwards?

MR. HILL.—I had two reasons for adopting this plan some years ago. One was, in planting corn on the sod, sometimes I had it eaten by worms; the other was, that it was the only place where I could put the oats and have them stand up. If they followed any other crop they would not stand up. That is the farthest removed from the land that had been manured. In turning over the soil and sowing oats, then, I put on all the manure I can get, then follow the corn, then the wheat, then the grass again, so that the oat crop being the farthest removed from the sod, is the most liable to stand up. I would say that the figures I have given here as to the number of cows in this state, are taken from the statistics of 1885 and, of course, the dairy interest has grown wonderfully in two years.

EVENING SESSION—MARCH 27.

WISCONSIN'S AGRICULTURE.

By F. B. NORTON, Racine County, Wis.

First Paper.

HON. HIRAM SMITH in the Chair:

Where the Profits Go.—I sometimes hear my neighbors talk in a discouraging manner in regard to the business of farming in Wisconsin. They say that the opening of the grain fields in the Northwest has taken the profit out of grain raising, that the great ranches of the far West have taken the profit out of stock raising, and that oleomargarine and its kindred products are taking the profit out of dairying.

A Discouraging Feature.—It is true, we have had one discouraging feature the past year, that of the great drouth, which I look upon as, after all, a more serious thing than these which I have already named, and yet it is one of the good things to be said about our good State, that drouths are not frequent here. I remember hearing one of the oldest settlers of Racine County making the remark that he had lived here a good many years, and never yet had lost a corn crop. Now, notwithstanding these unfavorable things I have mentioned, I must say that it is my sincere conviction that, for the capital required and for the risks involved, farming it the very best business in the State of Wisconsin, and, further, I must say that I believe that this good State of Wisconsin, which came as one born rather out of due time into this Union, is the best of all the States in this United States, in which to live and practice this, the highest and noblest of the vocations of man.

Our Resources.—I have traveled during the past thirty years through the West and South, and I never have seen an area that surpassed Southern Wisconsin for picturesque beauty and fertility, and, of later years, as the railroads have penetrated the great forests of the North, I have followed them hundreds of miles away into the wilderness, and I have come to realize that we have land and resources enough to make an empire. After all the other states about us had taken what they could get, they left us a piece of land three hundred miles long by two hundred and sixty miles wide, an area nearly equal to that of England. We have a population of over 1,500,000; England's population being some 25,000,000, and I believe that there are resources in our state which may develop so that we may support a population equal to that of England.

Forests and Lakes.—Now, what have we done in agriculture and how stands the case with us? As I look over

this State, I find that it contains about 34,000,000 acres; about half of this we have divided up into farms, and about half of that again, or 8,000,000 acres, is improved. We have about 16,000,000 acres yet of unbroken wilderness of pine and hard-wood forests stretching away through the North, and then, as the Irishman would say, the best part of our land, after all, is the water. We have 3,000 square miles of lakes in this State; yes, gems of purest ray serene in native beauty. These lakes will yet be worth more to us than an equal area of land; have you not noticed already that these lakes in the southern part of the State have enriched the owners of their banks and have been year after year attracting the worn and weary toilers of the cities, seeking to secure rest and recreation, to their sides, and we shall find that these lakes will yet add vastly to the resources and the wealth of our beautiful State.

Farms and Farmers.—We find that the portion of our State which has been carved into farms is divided into 136,000 farms, the average size being 120 acres. Now, if we go to the old slave States, Virginia and the Carolinas, we will find a different state of things to exist. We have here scarcely more than one hundred farmers owning farms over 1,000 acres, but in the slave States you will find from five to fifteen hundred farms of 1,000 acres and over. That speaks of slavery and the centralization of wealth in the hands of a few. What chance is there for the development of farmers' institutes in a population like that?

Wealth of Farmers.—The average wealth of the farmers of this State, as given by our census of 1885, the average income from farm products per year, is about $4,200, which is a large average for the entire State; here in the southern part of the State, the average is, perhaps, twice that, seven or eight thousand. Just compare that for a moment with the condition of farmers in other lands. In England, Mr. Foster tells us that there are large districts in which the agricultural laborers have never accumulated so much as one week's wages in all their lives. In all Prussia, that magnificent country, that leads Europe to-day in material wealth, I am told there are only 108 estates that are valued at more than $7,500, while I can go through three great counties in Southern Wisconsin, and find farmers by the thousand who are as well off on the average as those noblemen of Prussia.

What the Farms Yield.—And what are the farms yielding to us here in the State of Wisconsin every year? First comes the grain product, $44,000,000, then the live stock product, $21,000,000, then the hay crop, $13,000,000 and so on. I might go on down through the list until I would gain a grand annual total of $98,500,000 poured into the laps of these farmers every year. But that census did not enumerate all of the sources of wealth, and those figures should be changed to at least $110,000,000, as the annual revenue of this State.

Credit of Farmers.—Our dealers in agricultural implements, speaking of the credit of the farmers of this State, tell me they don't lose from bad debts from the farmers of Wisconsin half that they do from those of other States in the West.

Cause of Our Prosperity.—Now, why is this high average degree of prosperity found in our State, or in any land? I will tell you. It is because some twenty-five years ago, we called the manufacturer to our side. We found at the opening of the war, which set all idle hands to work, and aroused industry

as it never before was quickened in the history of the world, that every farm on the vast prairies of the West, seemed to call for an acre of our timber. The saw mill multiplied in the forests of the North and a new source of wealth came into this State, the manufacturer. First comes the milling interest with its annual product of $20,000,000., then the iron interest with $10,000,000 more and so on down through the list; the cotton and the woolen interests, until our manufacturers in their turn give us a round $120,000,000 a year, duplicating and more than duplicating the wealth which you derive from the soil. This is an equal balance of things that is rarely found in other States. Turn to Massachusetts. There all that her farmers add to her annual wealth is $24,000,000; her manufacturing products are $631,000,000, twenty-five times as much. What chance has the farmer's boy in Massachusetts? He must either go into the factory to work or come West. I can't remember the time when I was not waiting to leave Massachusetts and come West, and I think I found the State in which it is most desirable to stay.

Our Commerce. — Now, we have spoken of agriculture on the one hand and manufactures on the other, but I have not mentioned the third great source of human wealth, commerce. Did you ever think how admirably we are situated here in Wisconsin; how the great trunk lines that used to be seeking to get into Chicago are now with equal eagerness seeking ingress into St. Paul and Minneapolis and the new Northwest, and all those great lines of railroad must past over our territory; besides our great lakes and the Mississippi River, we have great advantages from our railroad facilities. In 1860, we only had 1000 miles of railroad in this State. Now, they cover the whole State with a net work—these railroads, that bring us as near New York as Vermont. Silently and steadily, year by year, we have emerged from the age of iron into the age of steel. We all know the price of carrying our products to the seaboard has been reduced nearly one-half during fifteen years, and the farmer has received the benefit of all this.

Value of Trees.—We have learned from the manufacturers the value of a tree, and it is time for us, as farmers, to put such lessons as this into practice for ourselves, and to apply the same principles of business and economy and system of management to our business as they do to theirs.

As I look over the manufacturing industries of this State, I find that these raw materials, these trees in the forest, have a wonderful value here. I have seen magnificent trees in Western Tennessee, where the value of the land is only ten dollars an acre against twenty-four dollars for our lands in Wisconsin, because they do not appreciate the value of those forests; they cut them down and burn them.

I once bought an acre of magnificent trees, the like of which you never saw, and I paid one dollar apiece for the trees the common price for timber in those regions, but one of those trees, if brought to Milwaukee and transmutted into articles of utility and beauty, would be worth more than all the cotton the Southerners would raise on that acre for five hundred years. The forests of Wisconsin and their products are known throughout the world. The farm wagons of Racine are as well known in South Africa as in Wisconsin.

Value of an Acre.—Let us as farmers learn the value of an acre. There is one man in Wisconsin who has honored his profession; he has honored nature

and nature's God. I believe Mr. Smith, of Green Bay, has learned the possibilities of an acre of land; a good many of us have never learned that lesson. It took us years to learn that we must give back to the earth what we take away, and as soon as we began to bring science to bear on this question, the land rises to meet us, and it seems as though the possibility of a single acre is endless. When I first came to the State an acre of land that yielded ten dollars, did pretty well. Now, under the hands of skillful farmers, many are yielding a thousand dollars, and some even two thousand. If we will only treat the soil as God would have us, we shall find it indeed sacred soil, and I bow in reverence before our Mother Earth when I think of the boundless possibilities of wealth she has in store for us when we come to farm on the right principles.

Our Climate.— We hear a great deal about the salubrious climate of Southern California, but did you ever think, my friends, that we have a climate here in Wisconsin that is worth more to the raiser of food than the climate of Southern California? The average yield of wheat in England is but thirty-five bushels to the acre. They dare not make it any more with their damp climate; but we have a climate here that has endless possibilities for grain raising as well as stock raising. We can carry our crops up to almost any amount we please. I have read of as high as one hundred and five and one hundred and twenty-five bushels being raised, and now one grand discovery has been made during the past few years which is going to do great things for our crop of Indian corn—I mean the silo, which is as valuable a discovery to the farmers of this country as was the discovery of the cotton gin to the manufacturers down East, thereby carrying summer into winter and saving the heavy expense of winter feeding. What a treasure for our dairy interest! And we live just in the climate for the dairy interest, one of the most important sources of wealth to the farmers in the land.

Value of Animals.—Now, we should learn still further as farmers, the value of the animal. We are well stocked, as you might think, but there are very few farms but might easily double the number they have and not be overstocked. We have a goodly number of animals, but the trouble is they are not good enough; we have not brought blood enough into our stock nor brains enough. Take the horse. We are almost a generation behind Illinois in the breeding of horses. We have got a splendid market in the North, and these great cities so near us are calling for horses and wearing them out rapidly. There are some 17,000,000 horses in the United States, and it takes one and a half millions to take the places of those that are dropped out every year.

Our Dairy Enterprises.—Then, take our great dairy enterprises. We have about six hundred thousand cows, but they don't give milk enough, they don't yield butter and cheese enough. Mr. Adams says, the average product is only about one hundred and eight pounds of butter, and it can be made twice that easily. There is one encouraging feature in connection with our dairy and stock interests, and that is, there has been more improvement in the last seven years than in any previous twenty years.

Stock Raising.—Sheep husbandry is one of the great interests of the State of Wisconsin, and is also one of the most important of our branches of industry Stock raising should be one of the great industries of this State, tributary to dairying.

Value of Men.—Now, friends, when we have learned the value of an acre, and the value of an animal, let us go a step higher, and learn the value of a man, and here is where we put a finger on the weak spot of our Wisconsin farming, after all. I have seen farmers make some mistakes in the raising of their colts and calves, but I have seen them make vastly greater mistakes in the raising of their boys and girls. I have seen the rich farmer treat his sons and daughters as the overseers in the South treat their slaves. From daylight to sundown they work like hired men and hired women. Now, I don't think boys and girls object to hard work, as a rule. I certainly did not. The only thing I objected to in my boyhood was this, that the time to go fishing never came. Farmers, we must give culture and education to our children. I say, give your children books, give them ennobling culture and a true practical business education, if you have to mortgage your farm to do it.

Industrial Education.— I am glad that the signs of the times are pointing toward industrial education. It is not simply book knowledge and technical learning we want, so much as a more comprehensive and varied practical knowledge, and if we will give this to our children, we shall not have so many of them fleeing from the farms and going to the cities. It is the educated farmers and farmers' sons who take their position at the head of each branch of their business. When you see a farmer engaged in the raising of blooded stock and making a success of it, you will find that he has, somehow, acquired the business knowledge and judgment which enables him to do business with other men of intelligence in that line. We must give to our boys and girls a comprehensive and practical education and we shall find them able to enter into and possess these rewards.

Favorably Located. — They talk about the attractions of the sunny South, but I notice that millions are poured into the snowy North. We live between the two great markets of the Northwest, whose wants we may supply in the future. There is no State so favorably located, and if we will, we may enter into this goodly heritage and we will find here all that human skill and God's blessing will give of wealth and power and comfort and refinement and beauty and civilization.

REORGANIZATION OF THE WEATHER SERVICE.

By T. C. CHAMBERLIN, President University of Wisconsin.

Second Paper.

Practical Education.—Charles Dudley Warner, in his recent article in Harper's Monthly, in connection with some pleasant things which he was good enough to say concerning our University, embracing some very appreciative words respecting our Farmers' Institutes, made some remarks which very

broadly hinted that we were too practical in our educational efforts. Concerning this implied criticism, we feel very much as a distinguished English statesman did upon a famous occasion on which he was charged with the atrocious crime of being a *young* man. It is an accusation we shall neither attempt to palliate nor deny.

Weather Service and Agriculture. —Until a very recent date, however, I had no intention of adding to the apprehension of anyone that we are giving our thoughts too largely to the practical, in anything I shall say this evening. I had intended to speak upon a subject of a general character, whose tendency would be rather in the direction of the ideal than the practical, but there has been pressed in upon my attention a subject of special and immediate interest to every citizen, and of some especial importance to agriculturists to which, in lieu of a more abstract subject, I desire to invite your attention. I refer to the movement now on foot to transfer our weather service from the military to the agricultural department, which it is proposed to place upon an equality with the departments of State, Interior, etc. It is not, however, the transfer merely in which I seek to enlist your interest and influence, but more especially in connection therewith to urge a reorganization of the weather service, with a view to more satisfactory results than it has rendered in the past. I would carefully guard myself at the outset, however, against giving the impression that the weather service has thus far been in any proper sense a failure. It has been in a very important sense a success, and yet, in my judgment, it has been very far from being the fuller success to which it will yet come, and which it may attain at a very early date, if it is properly reorganized to that end.

Objections to the Present System. —The objections to the present association of the weather service with the military department, lie in the fact that this association is incongruous. Nominally, the signal service of the military department, and the signal service of the weather bureau, have something in common. In reality they have more that is incompatible in their relationship than they have which is harmonious. They are alike in being signal services, but otherwise, for the most part, dissimilar. The military signal service has an important function of its own to perform; it requires a training of a peculiar character, but quite different in its nature from that which is requisite in the weather service. At the time it was inaugurated there were special reasons why the military posts of the then unsettled West, and the connecting government telegraph lines, should be utilized, as they were the only available means over wide and important districts. But with the settlement of the country, this special dependence has passed away.

The chief objection to the present association, lies in the fact that the systematic military habit of thought, and the precise rigid method of military procedure, are not adapted to so eccentric a phenomenon as the weather. Our storms do not move in accordance with the laws of battalions. Their formation is not controlled by simple rigid rules like those of military procedure — indeed, the phenomena of the weather, in their complex phases and in their seemingly lawless methods of procedure, are those whose characteristics lie most remote from those which dominate military affairs.

But I need not dwell upon the desirability of the transfer. It does not appear to be a phase of the subject that needs advocating so much as action. When

proposed to the last congress it appeared that the military authorities favored it; the agricultural department urged it, and congressmen were generally well disposed toward it, and nothing seemed necessary but to secure action, which was alone prevented by the pressure of other interests. It is now liable to fail of enactment chiefly from neglect, and from the obstacles to which delay is liable to give rise.

The chief consideration is the reorganization which should follow the transfer. This reorganization should be placed in the hands of expert meterologists, and should have for its aim the removal of the defects of the present system, and the attainment not only of a higher degree of precision in the forecasts of the weather, but a more definite and special adaptation of these forecasts to the agricultural districts and to the local peculiarities and needs of each.

Methods of the Present System.—You are familiar with the present system and some of the difficulties under which it labors. Observations are made at a large number of stations throughout the country, and these are telegraphed three times a day to Washington, where they are collated and the indications of the weather made up from the data thus afforded. Those indications, which are disseminated throughout the country at large, are chiefly made up in a very limited time after the receipt of the night dispatches. In this short time a large part of the collation of all this immense mass of data must be made, together with the formulation of the predictions and the sending of them forth by telegraph. When you consider the vast extent of our country, the complications introduced by the varied aspects of topography; of land and water; of forest and prairie, together with all those atmospheric complications of conditions and of movement that enter into the problem, it will be seen that the successful prediction of the weather in all its details, and for all of the districts, each with its own peculiarities, is a task which a single mind cannot completely perform. To expect complete success for any given locality is irrational under these conditions. The success which has been attained thus far is as great as could be anticipated. The system does not admit of the highest order of precision and of local adaptation. That you may appreciate the more readily some of the difficulties which enter into the task of prediction, I have prepared a map which will indicate some of the eccentric features which enter into the complex and difficult problem.

First Source of Error.—By a glance at it you will see that one source of error in the prediction of the weather, lies in the irregular and eccentric courses which some of the storms pursue. I have selected the courses of a number that passed over the country during a single year, and have indicated them by the black lines on the map. Some of these represent the usual courses of storms, and others those which are more phenomenal. It will be seen that the ordinary course is from west to east, with a slight northerly tendency; but it will be observed that there are very wide and peculiar departures from this general direction. (The peculiarities in the courses of several of the storms represented were then discussed in detail.)

Second Source of Error.—A second liability to error lies in the unequal rate of progress of storms, which is liable to introduce an error in the time predicted for the arrival of the storm. It is often as important to the farmer to foreknow the time when the storm will arrive as to know that it will arrive at

all. When the observations show that a storm is advancing at a given rate, it is obviously natural to assume a continued advance at that rate, and to predict its arrival at a given point accordingly. It is only by a critical knowledge of the atmospheric conditions and a quick and complete appreciation of their effects that the change of rate can be anticipated. This implies a completeness of special knowledge of the atmospheric conditions over the areas involved and a mastery of the data thus afforded, which cannot be expected of a single man for the whole of so vast and diversified an area. On the map the daily advance of the several storms along their paths is indicated by cross-bars. It will be seen that the variation is very considerable, and that some storms seem to hang in certain localities with relatively slight advance for a period sufficiently long to completely vitiate a prediction based upon a uniform rate of progress. When this is taken in connection with changes in the course of the storms, it will be seen that unless the officer of prediction can forecast these changes of rate and of direction, his predictions are liable to the most serious errors. These changes in course and in rate are obviously due to atmospheric conditions, and a full mastery of these alone furnishes a basis for and anticipating their occurrence. They must, therefore, be accurately determined, and must be within the complete intellectual control of the officer of prediction. It is not impracticable to secure this for given limited areas, but it is too much to expect it of a single officer having in charge the forecasts for the entire country.

Local Influences.— A further source of inaccuracy arises from local influences. These vary with every considerable district, and while their influence may not be great upon the general storm movements they may be altogether decisive respecting the local weather when the meterological conditions are nearly balanced. If the atmospheric conditions are such that a slight influence will determine local rain or the opposite, the result can only be trustworthily forecast by a knowledge of the influenee which local conditions bring to bear.

Topography. — Among these local conditions may be mentioned topography, which influences, more or less, the rate of progress of the storm, and which, by causing the currents to rise or fall, may determine whether there shall be precipitation or not. Rough topography retards the basal currents of the air, and causes those following in the rear to tend to mount over these, and thereby favors precipitation, on the same principle that an ascending slope does. In a similar way, forests act as a drag upon the basal currents of the air, while prairies facilitate their progress. Along with this comes also the cooling influence which forests exert, and the humidity which they yield to the atmosphere. According to current and rational theories, these conditions should favor precipitation, and perhaps determine it, when the conditions are otherwise closely balanced.

Among the local influences are the effects of large bodies of water. So also, according to the observations of my friend, Professor King, the presence of great banks of snow that linger on our northern borders after the surface here has become entirely bare, has a notable influence upon the course and character of storms. The nature of the soil in respect to temperature and the state of the surface, in respect to its covering of green growing vegetation on the one hand, or of dried and seared vegetation on the other, come in as tributary influences. The dryness or wetness of the

surface also have their influence. It is an apparently well sustained observation of farmers that, especially in dry seasons, showers have a tendency to follow each other in their courses, apparently because the moistened surface resulting from one shower favors the development of another in its rear, and thus there arises a cumulative effect. The belts fortunate enough to be moistened by the earlier showers have a better chance of being favored afterwards than those belts which were avoided by the earlier storms; whose very dryness gives them a less favorable prospect.

Now, these local elements are altogether beyond the intellectual grasp of a general observer situated at Washington. It is entirely beyond the capabilities of any mind, however retentive, and however masterful in its power of coördination, to keep in mind and combine all the modifying influences that spring from the diversities of the surface of the land, and from the previous precipitation. This being true, local precision and adaptation in the forecast of the weather can only be secured through extensive local observations and through the establishment of local centres of prediction. It is not of so much importance to farmers to know the grand features of a storm which sweeps over the whole country, as to know those specific phases which it will present as it passes over their immediate locality.

State Weather Service. — There should, therefore, be such a reorganization of the general system of observation and of prediction as shall embrace smaller districts, each having its own sub-organization and its own officer of prediction, the whole to be coördinated into one great organization, which shall perform the general functions of the present one. Each of these districts should receive the benefit of the observations in all other districts which affect its atmospheric movements. The observations of each district should be directed to the specific determination of those elements of the weather which are dependent upon local influences. The size of these districts will have to be determined by experience. That such an organization is ultimately to be reached seems to be clearly foreshadowed by the history of the present one. The large districts of prediction have been in a measure abandoned, and forecasts are now largely made for the several States separately. To a limited extent local centres of prediction were inaugurated. This movement is in the right direction, but needs development and systematic organization.

An auxiliary benefit of the orgnization should come in the establishment of a State Weather Service. Many States have done this already; we have not done so. The function of the State service has been thus far, and should largely continue to be, the distribution and display of the weather forecasts, and the recording of observations at as many points as practicable, thus supplementing the work of the general government.

Summary.—To summarize, I would urge, as is now being done in congress, the transfer of the Weather Service from the military to the agricultural department, and in connection with the transfer, the reorganization of the system so as to provide more completely for observations and predictions having specific adaptation to the local conditions of the several districts of the country, embracing the establishment of local centers of correlation and of prediction, and I would invite your coöperation and good influence in the effort to secure this more effective development of our National Weather Service.

INDUSTRIAL EDUCATION.

By W. I. CHAMBERLAIN, Pres. Iowa Agricultural College.

Third Paper.

The Human Hand.—The human hand is one of God's most wonderful creations. It is the only universal tool. Rightly trained itself and guided by a well-trained mind, its feats are well nigh Godlike. It is the creator of all things devised by man's mind, the tool that makes all intricate machines. The microscope, the telephone, the steam engine, the spinning jenny, the Brooklyn bridge, the countless things of delicacy and strength that make and adorn our civilization, are its creation and its handiwork as truly as they are the mind's conception.

Mistake of the Old Systems.—These three things, the thinking mind, the speaking tongue, the working hand, are the things that lift us up above the brutes that perish. They form the tripod, so to speak, on which manhood stands. Take one of the three legs from any tripod and it cannot stand. And yet this is just what our systems of education have tried to do; to train the mind to think and the tongue to speak, but not the hand to do. Is it any wonder that invention and construction were so slow? When Von Bulow thrills your very soul by his magic touch of the piano, it is because his mind flows through his trained finger tips and makes responsive keys and vibrant strings breathe forth the passion of his soul. But what if, now, those finger tips were senseless and untrained? Or, rather, what if Von Bulow had trained his soul and not his hand, and some other one had drilled his hand and not his soul? Could the two men have given us the matchless music of Von Bulow? And yet this seems just the mistake of our old systems of education and training. They trained the mind to think; less often the tongue to speak; but not the hand to do—not the mind to think through the hand of skill, the whole body to do with skill the bidding of the thinking mind. Or rather, they trained the mind of one man, and the hand and body of another, and then wondered that the two did not work as one of the great problems of invention and construction. They tried to divide Von Bulow into two men, one with soul-training, the other with hand-training, and expected the two distinct and discordant halves to unite and make the great pianist of the present day. They tried to put assunder what God joined together. They failed to see that as soul and body are themselves inseparably joined, so should their training be; that the mind's knowledge is power only when the skilled eye, hand or tongue, or the whole body, makes it to be applied knowledge. Slowly is the truth at last dawning upon us—great truths dawn slowly always—that true education is a symmetrical unfolding or training of all our faculties and powers.

Perpetuity of the Republic.—The only right that a republic has to compel the property to furnish an education,

and the youth to get an education, rests, I think, on the assumption that education makes the youths better and more useful citizens, and is therefore essential to the life, growth and perpetuity of the republic. This assumption is a true one provided the education fosters and promotes not only knowledge but also virtue, patriotism and useful skill—the power to use the knowledge for the good of the republic. If virtue be lacking, the republic goes to its death through sensual indulgence and sin, like the republics of the past. If patriotism be lacking, the republic dies through individual selfishness. If useful skill be lacking, it dies through the poverty of the common people.

Schools in the Past.—Our schools in the past, I think you will admit, have promoted knowledge, and on the whole, virtue. But they have neglected patriotism and skill. As to patriotism, our beloved Garfield had this to say in an address in 1867, soon after the war:

"There is not now, and there never was on this earth, a people who have had so many and so weighty reasons for loving their country and thanking God for the blessings of civil and religious liberty, as our own. And yet seven years ago there was probably less strong, open, earnest love of country in the United States than any other nation in Christendom. It is true that the gulf of anarchy and ruin, into which treason threatened to plunge us, startled the nation as by an electric shock, and galvanized into life its dormant and dying patriotism. But how came it to be dormant and dying? I do not hesitate to affirm that one of the chief causes was our defective system of education. There was scarcely a college in which more than four weeks out of the four years' course were devoted to studying the government and history of the United States; for this feature of our school system I have neither toleration nor respect."

Such are Garfield's wise and memorable words. I might add that the war itself would not have been possible if a thorough knowledge of and love for our country had been instilled in all our schools and colleges. But the war helped to correct this evil, and now the science of civics, or the knowledge of our government and of the rights and duties of citizenship under it, is made a study in nearly all our schools and colleges, and with the best results.

I have spoken thus clearly, though briefly, on these three essentials in an education, to make it plain that while I would bring in the new, I would not destroy the old; that I would supplement, but not supplant.

Duty of the State.—I come now to discuss the fourth point, viz.: The right and duty of the State to give its youths facilities for acquiring skill to use the knowledge given by the State. Is it not strange that this should ever have been questioned? Since in the end the State supports those who cannot support themselves, shall it not most wisely train the young in the best means of supporting themselves? Since paupers and criminals are everywhere a burden to the State, should not the State in very self-defense provide that there be fewer paupers and criminals, by furnishing to the young the means of gaining useful skill as well as abstract knowledge? Is not this the clearest and truest political economy? Think of a school system that gives to the son of the skilled mechanic in the city ten solid years in four grades of arithmetic, a perplexing and interminable labyrinth of intricate arithmetical puzzles, and of abstruse linguistic analyses in two or three languages, and three or four years of the higher mathematics, of literature and of mental and natural science, and then graduates him from the high school and launches him upon the world without the skill of hand and eye to

drive a nail, saw a board off square, or handle any tool or machine of useful industry; not only this, but our schools have, perhaps unintentionally and perhaps unconsciously, but none the less surely, turned our youths away from such callings. They have taught the sons of city mechanics and trade workers to despise the useful skilled employment by means of which their own fathers support them in the school in unproductive leisure.

School-Bred Boys and Trades.—Is it any wonder that our own school-bred American boys in our cities have not gone largely into the trades of physical skill, and that the farther on they go in school or college the less likely they are to enter such employments? The fact is unquestioned. It is a trite remark, "the boys are leaving the farms," but it is still more true that the sons of skilled physical workers are leaving the productive callings of their fathers, and going into "the kid-gloved occupations."

Many explanations are offered. Some say it is because the boys want a calling in which they can exercise their minds in thought. But the mind is as truly exercised in skillful work as in language. Orators, poets, writers, express thought in language. Generals, architects, inventors, mechanics, breeders, horticulturists, express their thought in action. God himself expresses his divine thought in action, in the ongoing, never ceasing, ever new creation of this world, with its manifold and marvelously thoughtful adaptations. Who then shall say that it is less thoughtful or less noble to express thought in action than in word, in doing than in saying, provided real thought be expressed? Who was it that worked at the carpenter's bench in Nazareth from childhood to his 30th year, as a preparation for that short three years of thoughtful teaching, of love and sacrifice that redeemed mankind and made real civilization possible? Who then shall be ashamed of the carpenter's bench or of any other tool or trade of skill, or who shall doubt that such trades may give true and noble expression to thought?

Why Boys Leave the Trades.—Others explain that our boys leave the trades and throng the clerical employments because of a natural distaste for physical activity. But we know this is not so. Boys often hate books, "dry fractions," interminable "partial payments," the labyrinth of subject, predicate and modifiers, of mood, tense, number and person, of gender and case, of agreement and government. But did you ever know them to vote against a picnic, or a vacation, or in favor of a shorter recess, so that they might stick more closely to their clerical employments? No; their very natures delight in physical activity. They romp and whistle, and run and shout. No, they do not shun the skilled trades from any distaste of physical employment. They do so, first, I think, because the schools have given them no drill and little knowledge to fit them for any skilled physical employment, but have given them much drill and special knowledge to fit them for clerical and professional life; and second, and largely, because the schools for centuries have cast the mantle of respectability and aristocracy about the clerical employments, and have denied the same mantle to the trades of physical skill. Clerks and copyists ranked higher, socially, in old times than skilled artisans did, I think, because reading, writing and copying were purposely confined to the learned few, and withheld from the common people and even from the skilled artisans. Hence, physical labor commonly went with ignorance or servitude, or both,

and, partly for this reason, was deemed menial and disgraceful for the free born and educated. In this country, slavery gave the same results at the South, and fostered the same opinions as to all kinds of actual, money-earning physical employment.

Literary Colleges.—Then again the literary colleges, followed by the professional schools, trained men for law, medicine and divinity. The military schools trained for the profession of war. The commercial colleges trained for commerce and trade. None of the schools trained for the trades of manual skill. In a word, they trained men for literature, commerce and destruction, but not for production. Until lately, no schools in all our land taught the sciences and arts of skilled productive industry in its strict or narrow sense.

Three results inevitably followed. First, those whose minds were trained to understand the facts and principles of science had not the skill of hand to make their knowledge useful to mankind by embodying it in inventions. Second, those with trained hands had neither the knowledge of principles nor the mental drill to make their skill of hand reach out toward inventive construction. Third, invention, therefore, circumscribed on all sides, was inevitably slow; while those who had the knowledge and mental training of the schools used it to hold down in poverty and servitude to themselves those who had not the knowledge to defend themselves.

Train Mind and Hand.—At last, a little more than a century ago, the idea finally took root in Europe that mind and hand should be trained together, because, first, through reciprocal influence, each could thus be trained better and more rapidly, and, second, when thus trained, both could far better work together through life; that the hand should be taught to apply to human use the secrets wrested from nature and from life by the joint grasp of mind and hand. This lifted skill of hand into the realm of thought, without degrading the realm of thought. Then and therefore was ushered in that marvelous era of investigation and construction that developed and seized hold upon the economic law of "the division of labor," increased four-fold the actual creation of wealth, and made possible our modern civilization, with its universal comfort and well-nigh universal luxury, to earnest, skillful workers. For now, with learning and skill combined, and using nature's materials and forces as the servants of mankind, there was no longer any excuse for human ignorance or servitude.

Apprenticeships Destroyed.—It was a social and economic revolution. But all revolutions require new adjustments. Note, then, with me, one new adjustment needed here. When the cabinet-maker, for example, himself by hand made every part of each bureau, desk or sofa, from the selection and seasoning of the lumber to the final varnishing and trimming, he took one or two apprentices into his home and shop and slowly taught them all he knew, as he himself had learned it, by severe and plodding toil. But now when an article of furniture is, with a hundred or a thousand more of like pattern, the quick product of fifty men and as many machines, in some great factory, the apprenticeships are by this very fact destroyed. The age is too rapid for the old, slow growth of an apprentice, with the consequent waste of material and power. What the mechanic and machinist of to-day need is a thorough knowledge of the principles of mechanism and of the working of machinery, with ready skill and deftness in the use of

tools, and the main point is that he needs this before he goes into the manufacturing establishment; just as the lawyer and doctor need their knowledge, and in part their skill, before they touch their first case or patient. This sort of knowledge I think our schools should give to those who are to be our skilled workers, just as they do similarly related knowledge and skill to our professional men. This is industrial education.

The Apprentice System.—There is immense economy in this kind of education as compared with that given under the old apprentice system. The apprentice was ignorant of book knowledge in the main; hence slow to learn handicraft, servant of servants, bound to his master by indenture, working where and at what he could earn most for his master, and not where he could learn most for himself,—sifting sand, carrying hod for the mason, piling lumber for the carpenter, "devil" and ink spreader for the printer, absorbing slowly through his hide, as it were, and by "rule of thumb" less knowledge and skill in seven years than he can now acquire in a single year in a good trade school, as has been lately proved in New York city.

Teach the Trades.—Now, since the apprenticeships are a thing of the past, and the trade and labor unions, from mistaken hopes of controlling competition, are closing, as far as possible, the chances for boys to learn the useful trades of skill, I see no resource left but for the state to teach these trades, or, at least, the general knowledge and skill that under-lie success in all trades. The state already gives all its children literary and mathematical knowledge. Many states carry all who wish through high school, college, medicine, pharmacy, dentistry, law, engineering and the like. But until lately in America our state and municipal governments have taught skill of hand and eye only to the unfortunate and criminal classes; in the deaf and dumb, the blind and the imbecile asylums, the reform schools and farms and in the penitentiaries. Even the name industrial school is disgraced and insulted by being applied to penal schools, in which boys, too dull to learn or too vicious to be controlled by teachers and parents, are sent and taught a useful trade of skill as the punishment. What can be the logical conclusion but that skilled industry is irksome and disgraceful?

Do you wonder, then, that our American boys are not flocking into the trades of skill, when the only avenues of approach until lately have seemed to lead through the reform schools or the penitentiary, and when all the respectable schools and colleges have been fitting men for the clerical employments and for commerce. If the state would teach these trades of skill more in the schools outside, it would have fewer men and boys to teach inside the reform schools and penitentiaries.

Do you say the state cannot afford to teach the rudiments of skill along with the rudiments of abstract knowledge? Is not this to say the state cannot afford to give the skill that creates wealth, while it can and does afford to give the knowledge that distributes and enjoys wealth? Is not this an evident absurdity in economics.

Trade Schools in Europe.—Fortunately this is not mere theory. Thousands of technical and industrial schools all over Europe, munificently endowed by government, have been for years sending forth annually hundreds of thousands of well-taught and well-trained workmen into all the trades of skill, including agriculture. The material wealth of Europe has been greatly increased, nay, the very life of its crowded

populations has been sustained, by the skill, made well nigh universal by these schools. Our sparseness of population and our broad domain of virgin soil have made us slow in this work of industrial education. And so the skilled workmen of Europe are filling the best paid positions of high skill in the trades, which should be filled in large part by American boys. Why? Not from any fault of theirs or of our boys, but simply because they have been trained in Europe to fill these places skillfully, and our American boys have not been so trained here. Can our government longer afford this? I think not. A good trade of skill, well learned, is worth more to a young man than $20,000 out at interest without the trade or its equivalent of knowledge that he can use in doing something that the world wants done. The world asks the young man fresh from school never "How much do you know of books?" but always "What can you do, and do it better than the bulk of men?"

Clerical Callings Overcrowded.—For reasons partly given, or rather hinted at, the clerical callings are overcrowded. Yielding too, to the inevitable law of supply and demand, they are worse paid than trades of skill. The social standing of the former, however, is higher, partly as a legacy of the past, and partly because our schools still cast the mantle of respectability about the former and not about the latter. The social standing of the latter will rise just so soon as our schools show the same favor here as to the former. For in the ultimate analysis the occupations of men should and will in time grade socially according to the degree of intelligence required and used in their performance.

The demand for skilled manual training is more pressing in our cities than in the country. Country boys on the farms gets dexterity, knack and self-reliance. What they lack is chiefly scientific knowledge. City boys get nothing but book knowledge in the schools and the business sharpness that comes from contact and attrition in crowded centers. Now it seems to me that as we train and equip our lawyers, doctors, veterinarians and business men in schools with all needed appliances, moot courts, hospitals, clinics, dissections and the like before they enter actually on their skilled professions, so must we have schools for technical and manual instruction and trade instruction with all the appliances and means of drill, for the future mechanic and machinist, foreman and inventor; and scientific agricultural instruction and drill for the future farmer, stockman and horticulturist.

Public and Private Schools.—Public and private liberality have within twenty-five years established large numbers of agricultural, mechanical and technological colleges. You have not failed to notice that nearly all the recent munificent private gifts and bequests have been to endow colleges of this sort. They are becoming numerous and well-equipped. What we now most need is schools of lower grades for the same sort of training. We need a public manual training school along side of every city grammar and high school, where principles of mechanism and deftness in the general use of tools shall be given; and perhaps private trade schools, where at night, for moderate tuition, training in specific trades shall be offered.

Do you say this is hopeless? It is already well begun. Public manual training schools are already found in nearly all our great cities, and private trade schools in a few. I have visited many of the former and some of the latter. I have talked with city school principals and superintendents and read their

printed statements. Their testimony is unanimous that pupils do the regular book work of the public schools better where they have this manual drill besides; that it is not a hindrance but a help to the regular school work.

Skilled Manual Training.— The introduction of skilled manual training into our public school system will not today excite greater opposition nor work a greater revolution than did the introduction of industrial drawing some thirty years ago. It will not cost the State so much as "free text books," now urged by many. The three steps historically have been: first, to read and talk about things; second, to learn to make drawings of the things; third, to examine sharply and learn to make and use the things themselves. For centuries our schools took the first step alone. Some thirty years ago they began to take the second, a great advance. Now we are about to take the third. When we shall really have taken this third step, then and not till then shall we have learned to walk.

ENSILAGE SESSION—MARCH 28.

FIELD CORN CULTURE.

By D. F. SAYRE, Rock County, Wis.

First Paper.

H. C. ADAMS in the Chair:

Clover and Corn. — There is an old adage to the effect that "well begun is half done," and in regard to field corn culture that adage applies admirably. There are two crops which, as a farmer, I like and which supplement each other. I refer to clover and corn, and it seems to me that to grow a crop of corn I have to begin the year before I plant it. Clover and corn supplement each other, because the protein that we find in the hay supplements the fat-producing corn, and if I have fed properly, instead of feeding out five bushels of corn, I have only fed two and a half bushels, supplemented with two and a half bushels of some protein feed; otherwise I have lost the proportion of benefit in the excess of one kind of food over the other.

When I Sow Clover. — I always sow my clover in advance; I sow it two years in advance, and I do it in the first place to give me a beautiful mat of growing verdure from early spring till late fall, because the rains of heaven bring to me the fertilization that I need for my corn, and the clover lies there like a great sponge to hold those fertilizers just where I want them for the corn crop. That is the natural process of fertilizing my land. Then, again, this clover goes down to a greater depth into the ground, to bring up the mineral elements that we need for our use, and stores them on the surface. This it does by some wonderful machinery, storing these mineral elements right in its roots near the surface of the ground; it gets it in some way from the air above or the ground beneath. Still another reason why I like to grow clover is, that there is no way in which I can cultivate my field and get a seed bed for my corn, with the ease and certainty that I can by growing clover.

Turn Under in October.—Then, in the month of October, turn under your clover, and I like to turn it under uncut. I think there is additional benefit, and then we will see the mechanical influence of clover in the softening of the ground, in breaking it up and pulverizing it, and in no other way can I get such a good seed bed to use in the spring. So far before planting I have my seed bed; I put on my disc harrow and run it this way and that way, until I have fully broken up that seed bed and made it level. What do I do then? I want to plant something on it. I want seed corn, and how shall I get it?

Early Maturity of Seed. — The preceding year, in September, at the latest, I go into my field and look for the seed that I want. I

look in the first place, for the early maturity of the seed; not the earliest. I think if we look for the earliest, we are apt to cause the corn to degenerate; the crop will grow less and less. But I do look for early, fair maturity, and I look for another point. I mean uniformity in getting the seed; I don't want one ear of one kind of corn and another ear of another kind of corn for my growing crop; I want seed that shall be as nearly uniform in maturity as in size, in color, in looks, and with those two points before me, I go into my field and pick my seed corn, not later than the first of October.

Fire Dry the Seed.—What then? C. R. Beach says: "Take the corn and fire dry it, and that is the whole sum and substance of it." I want this seed artificially dried and cured. We have met many farmers who say this is not necessary, but I beg leave to differ from them. Once in a while your corn will come out all right without any artificial heat, but we have to move in such a way that we shall be certain. So I say, take the corn in any way you choose, only that artificial heat shall come to it in some way, to dry it before the severe freezing of winter shall come on and hurt the germ.

Planting the Corn.—Now I have my seed and my seed bed. How shall I plant it? We all know how. We have our two-horse planter and we plant it; some plant in drills. I like to plant in hills, with the rows three feet eight inches apart, and about the same distance in the row, but it doesn't make much difference except this: It wants to be planted a fair depth; so deep that the dry weather shall not retard its growth.

Dragging the Corn.—The first important thing in the culture of this crop of corn is the dragging — the harrowing of the corn — before it shall come up, and that is something we all have been negligent about. We differ a great deal about the extent of harrowing. I don't like, myself, to harrow it after it barely comes up, but if we will put in our harrow after we have planted it just as soon as we can, within a day or two, and go along and harrow that corn, killing the germ of the new weeds which have come up, we have accomplished a great deal. We have half cultivated that corn when we shall have gone over it with the harrow twice or even three times before it has come up.

Cultivating the Corn.— I cultivate my corn so as to keep it level. The old fashioned way used to be to hill it up but I think the best success is in level culture, moving the surface of the ground just as often as we can conveniently before the corn gets beyond our reach.

I don't know that I have any other process. I only know that if I can have a bed of clover to plow under; if I can get at it fairly early in the spring, with my disc cultivator; if I can plant it with the corn planter about two and a half inches, or a little deeper than that, I can get it in the moisture, and if I can work it two or three times just before it comes up, and then as it comes up, I am almost absolutely sure I shall have a crop of corn.

Last year I failed in my corn because I had no clover bed. My neighbor had a good crop of clover, and plowed it up in the spring, and for miles around his was the only piece of which you, gentlemen, would have said: "There is a field of corn."

Discussion.

MR. CADWALLDER.—Do you plow under the second crop of clover?

MR. SAYRE.—Yes, my rotation has been one of four years. I want to say

another thing that I forgot. If, at the last cultivation of the corn, we will sow on a crop of rye, say the last of July, we will get a crop of rye started so when we come to cut up our corn-fodder, we will let the rye grow later in the fall and feed it to our sheep and cattle and thereby we have the fodder for our cattle and sheep and off the same land we have a green growing crop, which shall store up the elements near the surface, thus giving us two results.

MR. NORTH.—I understood you to say you harrowed your corn three times before it came up.

MR. SAYRE.—I would like to do that. I would like to keep the harrow going all the time after I planted, until it comes up. The difficulty I find is when it just comes up; the first inch is more tender than when it gets up further, and, therefore, I want to straddle the row very carefully; it is more dangerous just when it comes up than it is before or after. I don't think it hurts to step on it before it comes up. It may mash it down some, but I don't think it hurts it as much as it does it good.

MR. COOLIDGE.—Don't you harrow both ways?

MR. SAYRE.—Yes, sir.

MR. HOARD.—Harrowing corn is becoming a very general practice with us, and I notice that corn is harrowed later and later every year; men are harrowing it when it stands taller than they ever supposed they dared to do.

MR. ANDERSON.—I harrow corn when it is from six to eight inches high, and it does not injure it so much as to harrow it when it is one or two inches high; but I harrow the corn ground thoroughly before planting it, if the season is favorable, and it don't require so much harrowing before it comes up, and I wait until after the corn is up. When the land is prepared as Mr. Sayre says, I don't think it would need harrowing so much. Just before my corn comes up I roll it and harrow it thoroughly.

MR. HOARD.—Do you make any provision for the teeth running too deep?

MR. ANDERSON.—No, I have a very light harrow that will take in five rows of corn, which is made specially for harrowing corn, and the teeth are not set as deep.

MR. HOARD.—The practical use of harrowing corn is only to start about half an inch of the surface soil.

MR. ANDERSON.—I like to start it about an inch and a half. You will find that the weeds will start two inches below the surface, and there are only two ways of killing weeds, that I know of—one is by tearing them up, and the other is by burying them.

MR. HOARD.—A harrow fixed with lugs so that it will enter but about half an inch you will find will do most excellent work.

MR. SAYRE.—The first harrowing I ever saw of corn was in Will County, Illinois. To my surprise, the farmer had taken a two-and-a-half foot roller and had rolled over his corn lengthwise, when the corn was standing six or eight inches high. Then he put his harrow on and harrowed it, and I said: "My friend, that field is ruined." In a week's time I came back and that corn was standing up as straight and nice as could be, but I wouldn't like to try that myself.

MR. STEWART.—How deep do you plow that clover under?

MR. SAYRE.—About four and a half inches. If I plowed in the spring, I should plow it shallow.

MR. ROBINSON.—I have a method of cultivating corn that I like very well. My corn ground is marked, and just before the corn comes up I take my horse cultivator (two of them if my field is

large) and cultivate the rows, just as if the corn were up; then I cross it with my harrow, and you can get the start of the weeds. That is an excellent way where the ground is hard; I have followed it many years.

MR. GOULD.—That is an excellent way where you drill in your corn.

FODDER AND ENSILAGE CORN.

By JOHN GOULD, Portage County, Ohio.

Second Paper.

Value of Fodder Corn.—This question of fodder corn has come up in a new form within the last three or four years. We are just beginning to realize the value of fodder corn. For the last three hundred years, I presume, we have been acting on the principle that all there was of the corn crop was the ear corn, and wasted largely the stalk. Whereas, if we had known better, we would have found that the stalk had almost, if not quite, an equal feeding value to the ear corn. Sixty millions of acres of corn are raised in the United States annually, and forty-five million head of horses and cattle eat up our meadow hay and our corn, whereas, if our corn fodder could have been saved it would have been ample, I think, to fully winter all our cattle. The silo has brought new revelations to us, and given us a value in fodder corn that we have never had before; at least, it has called our attention to it in a way that we have never had it called to us before, so that we have now begun to make a study of fodder corn, and what it may do for us in the way of giving us cheaper and better rations for our cattle. We are beginning to find out that the average farmer must devote about two or two-and-a-half acres of meadow land to it, to get the roughage to winter a cow or steer. If he will put in his fodder corn and take care of it, in the new ways, he will get the roughage on an acre that is ample to winter two or three head of cattle.

Its True Feeding Value.—This brings us to the question, how shall we get this crop, and get its full feeding value? In the past, we have failed to recognize that nearly, if not quite, sixty per cent. of the feeding value of corn is the gift of the sunshine and of the air, and in the past, when we have been sowing our fodder corn, we have attempted to get as much as possible in the way of seed upon the ground. Most of us have been sowing from two to four bushels of seed corn upon an acre, so as to make the corn thin and fine so the cattle shall easily feed from it. Later demonstrations with fodder corn have taught us this lesson: That we should not plant over eight to twelve quarts per acre, in the form of drills, the idea being to let the sunshine and air have free circulation into our rows of corn so it shall develop; so we plant the

corn very thinly and force its growth, and in this way get its feeding value. It has been demonstrated by the Massachusetts Experiment Station that corn sowed in the usual way, three bushels to the acre, has only about eleven per cent. of feeding value to the one hundred, but with our best field corn it runs above fifty per cent. feeding value, so we get approximately three times as much by planting thinly. Then, our later system of putting up corn fodder in silos, has demonstrated that we need to care for our fodder corn better, by letting it stand in the field and mature at the last part of the life of the corn. How shall we do this? By planting it earlier, so as to get a growth. Remember that one week of the first life of a corn plant is worth nearly three weeks at the close of its life, in adding to it maturity and growth. Another thing that we are finding out about our fodder corn is, that its intention in life is to grow grain, and just as we deprive it of that by crowding it, we are detracting from its value. So we want to plant early, so it shall get length of season and grow a good plant; we want to let it mature so as to get all its feeding value, and then we want to preserve it in some way so as to get all its value at the last. How we shall cultivate this corn, has been very well said by Mr. Sayer.

What Kinds to Plant.—Just what we shall plant for fodder corn is a problem that is under discussion to-day throughout the north—whether we shall plant our best varieties of dent corn, acclimated to our localities, or whether we shall take the big Southern corn from the tide-waters of Virginia and get a larger weight to the acre, but whether more food, is a matter that we must demonstrate for ourselves. We must have a crop, anyway, and it has been demonstrated, during the terrible drouth of last year, that the Southern corn has wonderful vitality and makes an almost sure crop. I planted four varieties alongside of my ensilage corn. The ensilage corn was a magnificent crop, while the three other crops together would not more than average with the ensilage corn. Plant some kind of fodder corn; let us abandon feeding quite so much expensive hay, when we have a crop that will give us a big, abundant ration for our cattle cheaply, let the weather be what it may.

Discussion.

THE CHAIRMAN.—Tell us how to cut the corn and put it up and feed it dry.

MR. GOULD,—My plan of cutting for the last two years has been wholly with the reaper, which leaves it in gavels on the field. I wilt it about twenty-four hours, and then put it in the silo. Previous to that time it was my plan to wilt it and put it up in bundles, about twenty-five bundles in a shock. I put it up about sixty to seventy-five bundles, and make a roof over it.

MR. SAYER.—Are there not facts to show that the Southern ensilage corn has more saccharine matter than our common field corn?

MR. GOULD.—I am not prepared to say exactly that, but I am prepared to say that the cattle will consume the Southern fodder corn when they will absolutely refuse to touch our field corn. During the past summer, I fed some to my dairy cows, right in the pasture, and, even there, it was almost impossible to find as much as a butt left over. This fodder corn should not be put up in two big a shock; it is very likely to mould unless it is wilted nicely.

MR. ISLER.—Do you cut your Southern corn with a reaper?

MR. GOULD.—Yes.

MR. ISLER.—If it grows as big as that

which I have, you would have pretty heavy work. I had some that grew seventeen feet high, and the stalks as large as that lamp; it may not grow so large in your part of the country.

MR. GOULD.—It grew on the average twelve feet high. My neighbor and I cut it between us, by using a sweep-rake reaper. Of course, you want to make an extention to your reaper—put cleats on, so they will run out two feet more. I have had no trouble, and it is a great deal cheaper than any other way. You can cut in two hours what it will take two days to cut by hand.

MR. WISE.—Can you cut in windy weather?

MR. GOULD.—It will tangle more, of course.

PRES. W. I. CHAMBERLAIN.—I have no doubt there is more saccharine matter in the Southern corn than in ours, but the principal point in this matter is that it is absolutely impossible for any of our varieties of Northern corn to raise the amount of fodder per acre that the Southern corn will. There is twice the leaf growth on the Southern corn that there is on ours; then there is twice the stalk growth. But with us, in Iowa, it is simply impossible to cut it with a reaper. I am not a betting man, but I have $100 for anybody who will do satisfactory work, with any reaper yet made, in our Southern ensilage corn. The main trouble with us out there is, that we have winds, and we have them strong, and they tangle the corn so that it is simply impossible for any reaper to handle it. I should like to see a reaper that would handle stalks seven inches in circumference, even if it is not tangled. In spite of the fact that it is a temperance State, it gets the tangle-foot once in a while.

MR. GATES.—How am I to know whether I have got the right seed or not?

MR. GOULD.—You will have to depend on the reliability of your dealer, just as you do when you buy anything else, not knowing where it is produced. There are several different kinds advertised, but I understand it is all substantially from the same locality. The B. & W. is the brand of the firm who first handled it, and there may be other corn from the same locality but sold under different names. It is sufficient for you to find out, as near as may be, that it is the tide-water corn from Virginia, and not a white corn from Kansas or Missouri, sold under the name of the B. & W. corn. There are agents who can be depended on to sell you the right thing.

THE CHAIRMAN.—What is the sheep-tooth corn?

MR. GOULD.—I don't know, unless it is a brand that the Southern corn is sold under; it may be the same thing.

MR. GATES.—Now, some, in advertising, say that the sheep-tooth will bear more leaf.

MR. GOULD.—It can't bear more than the Southern.

MR. PALMER.—Last spring, I bought the Burrell & Whitman, and paid two dollars a bushel for it, and I got some from Chicago for one dollar, and I couldn't see any difference. The man who handled the B. & W. corn visited my home, and he couldn't see any difference. All there is about the ensilage corn, in my opinion, is: It is Southern corn, and it don't make any difference whether we buy it under the name of B. & W. corn, or under any other name.

MR. GOULD.—We had a lot from Georgia that was not ensilage corn at all.

MR. J. M. SMITH.—I received, last summer, what purported to be a report from a Professor of Agriculture in New Hampshire, in regard to the different varieties of corn, and the tests they have been making there with corn and ensil-

age, and for feeding. The Southern ensilage corn, in that case, yielded twenty-five tons per acre. Varieties of our common flint corn yielded fifteen tons per acre. A chemical analysis of the two varieties showed that the common New Hampshire corn was just about equal in feeding value to the ensilage corn per acre; that is, the fifteen tons of the flint corn were just about equal to the twenty-five tons of the Southern ensilage corn. The tests in feeding were practically the same, so that the final conclusion from that test was, that they were handling ten tons of ensilage corn for nothing. Now, if further experiments shall show that those results are correct, it is a great advantage for us people in the far North, where the ensilage corn will do its best, that we can substitute our flint varieties for it.

MR. ADAMS.—Was that B. & W. corn planted thick or thin, and was it properly matured or not before it was cut?

MR. SMITH.—I don't know about that, the report did not state those facts.

MR. HOARD.—Do you think, Mr. Smith, that B. & W. corn would make the same growth in New Hampshire that it would in Wisconsin or Iowa?

MR. SMITH.—I only judge from the growth it did make.

MR. GOULD.—I want to speak a word about that New Hampshire experiment. The B. & W. corn was planted at the time the little Yankee corn was, and at the time the silos were filled the Yankee corn was quite mature, while the B. & W. corn was just nicely tasseled out. If the B. & W. corn had had the growth and maturity of the next thirty days, I think the results would have been the other way. The New Hampshire climate did not give it time to put in its full maturity, and it was putting the fully matured Yankee corn against the half matured B. & W. corn. We have found that the common dent corn was perhaps three or four weeks ahead of the ensilage corn.

MR. JONES.—I have no doubt this B. & W. corn is all right if you want to use it in the silo, but here in this country I believe that the smaller kind of dent corn is the safest for the general farmer.

EXPERIENCE WITH FODDER CORN AND THE SILO.

By HIRAM SMITH, Sheboygan County, Wis.

Third Paper.

Important Discoveries.—I am called up here to talk about the silo. An empty silo is no better than an empty pocket book. Therefore, I will go back a little to the commencement, to find out what we want to raise to put into the silo. A few years ago, some enterprising men found out that the large Southern sweet corn contained more feeding value and was the best fodder plant to grow that had been discovered; that it was actually producing more to the acre than

any other forage plant known to the agriculturist. Following soon after upon this discovery, another class of men found out that this large, excellent crop could be preserved in the silo in its greatest perfection. These two important discoveries mark a new era in agricultural development; they bear the same relation to those engaged in animal industry as the invention of steam power applied to navigation on the water, locomotion on land and to the thousand industrial manufactures in the cities and towns. They make it possible for the farmer to make the same advance.

Value of the Silo.—This question has been discussed more earnestly through our state the past year than any other question which has been presented to the farmer in any period since our history began. It is the one absorbing question in nearly all the farmers' institutes that have been held, and if the institutes that have recommended and advertised these two methods of proceeding to gain our fodder for our cattle, have done nothing more than to bring fodder corn and the silo before the people of this state, they have earned the money it has cost four times over. This we shall soon find out. You may think it is radical talk to-day, but the time is fast approaching when the farmers will see the necessity of acting in this matter. A German farmer came to me one day (and he has a pretty large lot of stock, and a pretty limited supply of fodder); he looked over the silo, and the cattle that had been fed from it, and after he had about concluded his investigations, I asked him if he intended to build a silo. "——, I got to" he said. There's no question about it; he couldn't get along without it any longer. He had had to sell off one-third of his stock this year, and another drouth would have taken another third, and it was a matter of necessity. Now, this question has been discussed in the institutes, and I am proud and glad of it, and the inquiry still continues both in the institutes and outside of them. Owners of silos are flooded with correspondence from all over the Northwest; nearly every owner of a silo is visited almost daily; farmers come five, ten and twenty miles, come singly and in couples, and sometimes in platoons, in short, farmers are flocking to the silo like pilgrims to the Holy Land.

$400,000 Expended for Feed.—Now, what I have to say will be from my own experience. One remark more I will make. This grand awakening among the farmers of the state has come none too soon. There are single counties in this state, and I think Dane is among the number, where over four hundred thousand dollars have been paid out for cattle feed, outside of the counties—a greater sum than the entire state tax for 1884, for the support of schools, including the mill tax, the tax for the support of the university, for the insane asylums, and for the industrial school for boys. It needs no shrewd political economist to foresee that such a system of farming leads to impoverishment, and if there is a way out, we are all desirous to find it.

Kinds Fodder Corn Planted.—Forty acres of corn were raised, consisting of the following varieties:

Burrell and Whitman, (B. & W.),	22 acres.
Southern Sweet, (Sheep-tooth),	7 acres.
Wisconsin White Dent	7 acres.
Stowell's Evergreen Sweet	4 acres.

Feeding the Fodder and Ensilage.—Feeding commenced for soiling 95 cows and heifers on the 27th of July; 2½ tons per day were fed for 111 days, amounting to 277 tons. There were put into the silo, in Sept., 250 tons, and the rest of the crop in shocks,

129 tons. Total, about 656 tons, or an average of 16 tons per acre. The silo was opened Dec. 1st, and 30 lbs. of ensilage was fed to each of the 90 cows, for the night's feed, or 2,700 lbs. per day, until March 10th, 100 days, or a total of 135 tons, leaving sufficient ensilage to last until May 10th. The 30 lbs. of ensilage took and well filled the place of 10 lbs. of good hay. Had hay been fed for the night's feed in place of the ensilage, it would have required 900 lbs. per day for the 90 cows, or a total, for the 100 days, of 45 tons.

It would have required, in the year 1887, 45 acres of meadow to have produced the hay, which if bought or sold, would have amounted to $14 per acre. The 135 tons of ensilage were produced on 8½ acres of land, and had a feeding value, as compared with hay, of $74.11 per acre.

The Daily Ration.—The morning ration for each cow during the winter has been as follows: At 5 A. M. each cow was fed 2lbs of uncut hay, mainly for the purpose of having the cows get up ready for milking; after milking, dry corn fodder and barley straw, mixed and cut ½ inch lengths, making a ration of

Hay	2 lbs.
Corn fodder	6 lbs.
Barley straw	2 lbs.
Corn and Oats, ground	2 lbs.

For the evening ration, we fed

Ensilage	30 lbs.
Wheat middlings	3 lbs.

This daily ration would be insufficient without the development of ears of corn in the ensilage and in the fodder corn. Two years' experience goes far to convince me that 2½ tons of ensilage made from sweet-corn with roasting ears developed, is fully equal in feeding value to one ton of hay, and is greatly to be preferred for milk cows, calves, brood sows and shoats.

Silos Save Expense.—Experience confirms the opinion, that the full feeding value of a nearly matured corn crop can be saved with less waste in the silo than by any other method yet known, and the entire expense of husking, shelling, and grinding saved (not less than one fourth of the expense of the crop), and it is in better condition for feeding from the silo, than it is after the separation has been made. Ensilage corn standing 12 to 14 feet high is difficult to shock, impossible to stack, and impracticable to save in the barn. If left in the field, it is in the way of fall plowing which good farming demands, and if removed from the field and put up in ricks, it requires more labor than to put in the silo.

Cost of Ensiloing Corn.—The actual cost of raising and getting a corn crop into a silo, is often greatly overestimated. The common dairy farmer usually has all the men, teams, and tools required to handle a corn crop for the silo, and the only legitimate charge is the wages paid the men who are doing the work. The men on a dairy farm earn their board milking twice a day, and the team's expense is no more or less, on account of the silo. What then is the cost of ensilage per acre or for 40 acres? One man and team will plow 40 acres in the fall in 26 working days; wages $18. Two men and two teams, will, in the spring, cultivate and prepare the ground, plant with the horse drill, run the smoothing harrows, and cultivators until June 15th, equal to five months work, at $18 per month, $90. Eight men will cut in the field, haul to the silo, run through the feed cutter and pack in the silo, 23 tons per day or more, at an expense of $7.10 per day. To recapitulate:

Plowing 40 acres	$18.00
Plowing and cultivating	90.00
Cutting in the field and ensiloing 656 tons.	288.64
Seed corn 50 cents per acre	20.00
Total money expense	$416.64

This is equal to $10.41 per acre, or 69½ c. per ton. If to this were added, use and keep of horses, $125; interest at 6 per cent. on 40 acres at $80 per acre, $192; the use and wear of machinery, $25; entire cost of production would reach $758.64, or $1.15½ per ton. What then is the conclusion of the whole matter? Simply this: That 3 cows can be wintered 7 months on one acre producing 16 tons of ensilage, while it required 2 acres of meadow in the same year, 1887, to winter one cow with the same amount of ground feed in both cases. It may justly be said that one ton of hay per acre is a light crop, and is often doubled. Sixteen tons of ensilage is not a large crop; 24 tons are often obtained.

Preserving Fodder Corn.— Many columns and pages have been written, to prove that dry fodder corn is equally as good out of the silo as in it; that ensilage has no more nutriment than it had before going into the silo. These statements hardly settle the case. We do not put corn into the silo to gain nutriment, but to preserve from waste the nutriment already in it. The same argument might be used with equal force in the case of firewood. There is no more carbon in the wood when it comes out of the wood-house than when it went in, but it is in better condition to use, and no waste incurred. Each man will have to decide for himself his own method of preserving fodder corn. The great advantage to be gained in raising fodder corn does not entirely depend on the silo. The crop is a great good in itself, however preserved. Experience and observation will eventually settle, as it settles all other questions, the most economical method of its preservation.

Southern Corn—Putting in Silo.— There has been something said here about the Southern ensilage corn. My observation of it has been that it will prosper in almost all varieties of soil; that it will sufficiently mature for ensilage in almost all latitudes. We can tamper with it a few years and waste some little time in mixing the varieties. I have grown the B. &. W. corn for seven or eight years, and never had a failure no matter what the season was. We can also waste some time in experimenting with putting in the ensilage whole. If a man has no feed cutter or power, he can put it in whole and get good results, and he can get better results if he has a second crop of clover to tramp in, in connection with the corn, as it lessens the air spaces and helps the preservation of the corn; but he will find it unpleasant to handle when he comes to take it out, because it is ten or twelve feet long, if it is the proper kind of a crop. The cheapest way is to run it through a feed cutter. It can be done with a carrier, 22 or 26 feet, cheaper than any man can unload with the horse fork, and put into the silo quicker and easier than we can set it up in shocks, because the butts have to be straightened and set together. We have tried it and found that it takes seven or eight minutes longer to set it in the shock than to run it through the feed cutter. The work has been so simplified that it seems to me a farm of any size needs all the appliances required to cultivate and take care of the corn crop. No dry feed can be fed with the same economy as if it were run through the cutter; and so we shall learn step by step, lessening the labor and increasing the benefits of the crops we are raising.

Discussion.

PRES. W. I. CHAMBERLAIN.—What machine do you use to cut your corn?

MR. SMITH.—The best machine that I thought I could get. There are a dozen good ones. For the gentleman's private information, I will say, that I am using the one made in Manitowoc. I use sweep power.

MR. GATES.—Suppose we had a little shower after the corn is ready to put in the silo.

MR. SMITH.—Well, it does not very materially injure it. There would be a little more acidity in the feed; it would keep equally as well. If there was a frost threatening, I would not hesitate a moment. If it had already got frosted, I would put it into the silo and let it heat up. It is the drying up after the frost where the great injury is done to corn and if it was frosted, I would work night and day to get it into the silo.

MR. HOARD.—Will you state your experience with B. & W. corn and Sheep-tooth?

MR. SMITH.—The only objection I have to Sheep-tooth is the want of size. I raise fodder corn to get the most out of it that I can. We have been raising that small corn for twenty or thirty years and did not get very rich on it. Now, there is a better kind come, and still our old prejudices incline us to object to it, and to stand by this little corn that we have had. I don't want any corn that will mature in this country; it has not got vitality, it is not quite equal to the other. As to size, the Sheep-tooth I planted this year was about three quarters of a crop, the Evergreen sweet corn was less than half a crop, while the Southern corn can be depended upon for a big crop no matter what the season is. When we get potatoes we like them about as large as they grow. I am not a small potato man; I want big potatoes and I want big corn.

QUESTION.—What is the difference in the season of the Sheeptooth and the B. & W.?

MR. SMITH.—I don't know; that has got to be determined at the Experiment Station, by very patient aud long work, but it is somewhere about ten days. I don't know now whether the corn that does not mature may not have all the nutriment above the ground. I do not know but all the feeding value that ever will get into the stalk is already there. I think when the lower leaves begin to turn yellow, you get no more nutriment in the stalk or in the ear.

MR. BROWN.—I think I have heard you reported, by a seed man, as saying that you preferred Sheep-tooth to B. & W.

MR. SMITH.—I am glad you spoke of that. I hope that man is here. He issued a circular purporting to quote a letter of mine, to the effect that I preferred Sheep-tooth corn as the very best corn for ensilage. As soon as I read that circular I wrote to him and asked him to show me where I ever wrote a letter to him containing the quotation reported in the circular. He wrote back that he had no such letter, and he said a few other things that he understood in a conversation. He was at my house in the summer, when the crops were growing, and I didn't know anything about it. He knew I didn't know anything about whether it was good or bad, and he claimed that I said then that it was going to be the best. That accounts for the circular, and that is how I have been misrepresented. On the strength of that conversation he put it into his circular, to sell his corn.

MR. BARLOW.—Do you use your ensilage cutter for cutting dry corn stalks?

MR. SMITH.—Yes, we use it through the winter, one day in the week. The

ears being unripe, the corn froze perfectly solid, and we cut it once a week and allowed it to heat up on the long barn floor before feeding, and it would heat up and become quite hot, sometimes so that we had to pitch it over.

MR. HOARD.—How do you cut your corn in the field?

MR. SMITH.—Well, I feel somewhat as Mr. Chamberlain does about sweep rakes. I got one and tried it. I could run it until I broke it; it had to give way. I don't say it is impossible to cut corn with a sweep rake reaper, but it is simply impracticable with a crop that is big enough. Therefore, I cut it by hand and lay it in gavels. A sweep rake reaper scatters it badly; it needs a man to go behind the reaper. One man can't do anything there alone, any more than he can running a political campaign alone. We cut it by hand and lay it nicely in gavels to let it wilt one or two or three days; four or five days can't hurt it, if the weather is fair. We then draw it with two trucks and one wagon and one team. One man stays in the field to load his own truck, and another man has gone to the barn with a load and he finds a man at the machine unloading it. Each man keeps his own truck. The horses are changed and we never unload a load except as it goes to the platform, and so through the feed cutter. Then we cut into one inch lengths. In cutting dry fodder, I cut half-inch lengths.

MR. CADWALLDER.—Would it do to fill a silo in one day? Every farmer may not be able to own his feed cutter and horse power, and a number might join together and use them a day at a time.

MR. SMITH.—It would take a good many men to do it in a day. The best way is to put about three feet in in one day, and we therefore make small pits.

SILO AND ENSILAGE EXPERIENCE.

By CHAS. R. BEACH, Walworth County, Wis.

Fourth Paper.

Why I Built a Silo.—We rarely adopt improved methods except as we are compelled to by our necessities. It was the drouth of last summer (1887) that forced me to build a silo. After I had harvested my hay crop, I found that I must either sell my cows or make some provision out of the ordinary line. I had fourteen acres of fodder corn planted upon low, rich land that had stood the drouth well, and promised to be a fair average crop. I first visited the farm of H. S. Weeks, Oconomowoc. He had sixty head of cattle, but no hay; had twenty-five acres of B. & W. corn and a silo. He said that he was not troubled about the drouth, that he could winter his cattle. I next visited the farm of Oalmon Bros., Dundee, Ill., who claim to have kept 125 cows on 205 acres of land, and sold hay. It was the first week in August, and the

drouth was fearful. I found them feeding their cows on the last year's ensilage and bran. They had fifty acres of B. & W. corn; said they had no fears about feed for the winter. With such testimony, I came home fully resolved to build a silo.

How I Built My Silo.—My silo is twenty-four feet long by twenty-two feet wide, and eighteen feet high. It is built at the end of a bank barn, lapping eight feet against the barn; fourteen feet are against the bank. The bottom of the silo is on a level with the bottom of the basement of the barn, with which it it is connected by a door through which the ensilage is wheeled to the feeding mangers. The silo is built of wood, upon a wall on the side two feet high in which are set posts four to five feet apart, the tops of which are on a level with the top of the wall. On the bank side the wall is seven feet high. The sills of the building are of two-inch plank, one foot wide, held in place by spiking them to the tops of the posts in the wall. The studding is of plank, one foot wide, placed thirty-two inches apart (the width of building paper). The plates are of plank, one foot wide, and mortised to the top of the studding. The building is kept from spreading at the top by false rafters, spiked to the plate and the regular rafters, reaching across to the opposite rafter, two feet below the peak and securely fastened. The building is covered on the outside with paper tacked to the studding, and then with lap siding. On the inside it is papered; then furrowed out with inch strips, then sealed with good matched sheeting. The roof is of the best shingles. A partition divides the silo into two compartments. The whole cost was $150.

Power—Cutter—Wagons.—We used a one horse level tread power, a thirteen inch feed cutter, with carrier fourteen feet long (as the cutter stood upon the bank eight feet above the bottom of the silo), and two truck wagons, upon which were placed fourteen feet racks. These racks were as high as the top of the wheels, but low enough for a man to load a ton or more from the ground without the help of a man on the wagon, by placing the corn crosswise of the rack.

Variety of Corn Planted.—Our fodder corn was eight rowed yellow flint (Yankey), planted with a two horse planter, rows four feet apart, hills one and one-half to two feet apart in the row with four to six stalks in the hill. Almost every stalk had an ear of corn, and would yield seventy-five to eighty bushels of ears to the acre.

Cutting the Corn.—The corn was most of it glazed, and all large enough for roasting when we commenced cutting, and we picked our seed before we finished. The cutting was done with a self rake champion reaper, cutting one row at a time, leaving the corn in gavels of a size easy to handle; could cut an acre in an hour cleaner and better than by any hand work. We cut on two sides of narrow strips, going round at the ends. When the weather was fine, we cut after supper what we expected to put in the next day, which was about an acre.

Filling the Silo.—One man, with a team and the two wagons, would bring from the field, one would take the corn from the wagon and place it on the table, one feed the cutter and one stand in the silo. Four men in all, would, in eight hours, put in an acre supposed to yield fifteen or sixteen tons. The ensilage was cut one inch in length. We cut into each of the two compartment every other day. After the silo was filled, which took three weeks as the weather was stormy, we let it settle

four to five days, then filled again, and then covered with tarred paper, then boards and, after that, with seven to eight inches of hay weighted with a few planks and fence posts. It took ten and one-half acres of corn to fill the silo. It cost less money and labor to put in the corn, cut ready for feeding, than it would have cost to harvest it in the usual way of shocking, husking, or shocking and stacking without husking.

Feeding The Ensilage.—On the 19th of November, we took the covering from one compartment. We found the top, to the depth of two or three inches, black and slightly mouldy, but the cows ate it with apparent relish. We afterwards found spots near the corners, or at the extreme edges, in the same condition, but the cows have eaten it all. From the time we commenced feeding, up to March 28, I do not think there have been ten basketfuls wasted. The cows have eaten it clean; not only that, but the seventy-five or eighty bushels of ears of corn to the acre that were in the ensilage are so thoroughly digested that you can find none in the droppings. Had the same corn been fed in the shock, half as many hogs as you fed cows would have found their grain rations in the manure.

The Results.—Now for the results. We have been feeding this ensilage exclusively to cows from which we make butter—twenty-six in all—of which twenty-three gave milk for the whole time; one, part of the time, seventeen that came in since October and seven farrow and strippers. The daily rations for these cows have been from forty to fifty pounds of ensilage, twelve quarts of wheat bran and eight to ten pounds of hay, fed in two rations night and morning; no feeding in the middle of the day. The daily yield of butter has been twenty-seven and twenty eight pounds, requiring but eighteen to eighteen and one-half pounds of milk for a pound of butter. The butter has been sold for thirty-two cents per pound in Chicago, through a commission house.

After feeding the smallest compartment, which, being measured, was computed to hold four and one-half acres, we found that, after paying $120., the cost of the bran the cows had eaten, and $80, the estimated value of the hay fed, we had $460 and the skim milk for the four and one-half acres of the ensilage, and our work. We have been winter dairying for fourteen years, but we think that we have never before produced as much butter at so small a cost. We had fears about the quality of the butter, but the prices we received show conclusively that our fears were groundless. The cows have maintained their condition and we think improved in flesh, though yielding large quantities of milk and butter.

Pleased with the Silo.—This is my first experience with ensilage, and I may, in the future, change my opinion, but thus far it more than meets my expectation. I am more than pleased with it, I am enthusiastic over it. I think that a field of corn put into a silo at the proper time will yield one-half more feed than if handled and fed in the usual manner, and this, too, without any additional labor.

Some of Its Benefits.—Let me briefly sum up some of the benefits of a silo. All winter feed should be under cover, or it will damage and rust. The room required for a ton of hay, or a ton of corn fodder, will hold ten tons of ensilage. A silo can be built for less than a dollar a ton of its storage capacity. Your corn can be harvested at the time when it has the greatest feeding value, and it can be kept without waste and in the best possible condition for feeding. It can be handled at a less cost than any other

known method of harvesting it. The cattle like it, will eat all of it without waste, and *thoroughly digest* it. Cows fed upon it give increased quantities of milk, the milk is rich and the butter is good. An acre of good fodder corn ensiloed will, with a fair daily feed of bran, more than keep a cow for a year.

Discussion.

MR. EDWARDS.—How do you cover your silo?

MR. BEACH.—We covered it more than we needed to, I think. We covered it first with paper, then with boards, then with about a foot of hay, and weighted the hay with planks. I think the boards might well be omitted, and perhaps the paper and probably the plank.

MR. NORTH.—I came from La Crosse here for the special purpose of getting posted on ensilage. Now, would you feed ensilage wholly, with nothing else from fall until grass again?

MR. BEACH.—No, nor nothing else that ever grew. Even grass at its best can be improved by a grain ration.

QUESTION.—How much would you consider a ration for a cow that would weigh 1100 pounds?

MR. BEACH.—Well, I don't make any difference between a little and a big cow. Sometimes a little cow will eat more and give more milk. A man has got to have some common sense if he keeps cows, and give them about what they will eat.

QUESTION.—When you changed to feeding ensilage, did you find any difference in the value of the milk?

MR. BEACH.—When we commenced, our cows were very fresh in milk and they have kept up the flow extremely well—better than I have ever known them to. Mine is a wooden silo above ground.

MR. NORTH.—In order to make enough for seventy head of cows, would you advise two or three pits?

MR. BEACH.—I see no reason why you need to get in over two. My silo has a bank on one side. I have only to lift ten feet. Of course, the further you lift, the more power you have to use in lifting.

MRS. BARLOW.—In lifting into a twenty-foot silo, we have to use a thirty-foot elevator.

MR. NORTH.—What was your experience last year compared with this, as to the amount of milk it took to make a pound of butter?

MR. BEACH.—It used to take about twenty pounds of milk for one pound of butter during the winter. This last year it has taken eighteen and a half, steady. My cows are mostly Jersey grades.

MR. GOULD.—What was your experience last winter in the feeding value of the stalks?

MR. BEACH.—I had the same land planted to this yellow flint corn last year. We put it up in shocks, and commenced feeding to about thirty cows, and we had it all fed out by the first of March.

MR. PUTNAM.—Would you raise a root crop as against ensilage?

MR. BEACH.—I was once asked if I would raise roots for cows; that was before the days of ensilage, and I then answered that I had a good wind-mill, and that I could pump water easier than I could raise it, on my land.

MR. GOODRICH.—I have fed cows thirty pounds, twice a day, and I will say that, if you will give them ensilage, they won't look at hay, and they will thrive on that alone.

MR. BEACH.—Let me say, roots have a great nutritive value, on account of the water that is in them, but the labor of raising roots above ensilage is so large that we can hardly mention them at the same time. I wish to say, in regard

to ensilage as against the same amount of dry fodder, that when feeding shock corn in the same condition, I could keep about fifteen hogs behind thirty cows. Now it is not worth while to turn out the hogs; the ensilage is much more thoroughly digested, which gives it an increased value. It is stated upon authority that, even at its best, but sixty-six per cent. of dry corn is digestable, while ensilage is nearly all digestable, making it ten for ensilage and six for dry feed.

THE BEST CROP FOR ENSILAGE---ITS COST.

By GEO. A. AUSTIN, Clark County, Wis.

Fifth Paper.

Ensilage is Practical.—I can simply say that, from my experience with ensilage, I can confirm all the good things that have been said. It is practical for the large farmer, practical for the small farmer, practical for the rich farmer, and the poor farmer has no business to attempt to get along and keep stock without a silo. Of course, in speaking of ensilage, we speak of fodder corn as ensilage, not that it is the only crop that can be ensiloed, but because it is the important crop that we can raise the most conveniently and in the largest quantities. I have said that it doubles the feeding value of fodder corn to put it into the silo, and I want to be understood as qualifying that to this extent: While the silo adds nothing to the feeding value, it does preserve all the feeding value in the most economical manner possible, because it puts it in condition to be fed out to the stock at the least possible cost; because one man will do more toward feeding a herd of cattle from the silo than four or five men will from the hay mow—they will feed with less labor and in less time.

The Silo Saves Fodder.—Then I find this thing: That it is impossible for me to cure and preserve fodder corn in its perfect condition during the winter. If it is left out-of-doors it is constantly deteriorating in value, and I find it impossible to store it in the barn, so that it can be made to pay. Now, I give credit to the silo for saving this twenty to forty per cent. lost out in the field, and I say this alone is enough to give the silo all the benefit that is claimed for it in the saving of fodder at the least possible expenditure of its nutritive value.

Cost of Raising Southern Corn.—I was given, last season, charge of the business of finding out the cost of raising Southern corn. I opened an account with the corn field, and I will give you the results briefly. I kept an account with a man and team at $1. each. I did not charge anything for the board of the man, because a man milking from ten to twelve cows night and morning will pay for his board very well. I found the expense of plowing, seeding, cultivating the corn, and getting it ready to go into silo, was $4.50 an acre. From the

time I commenced cutting it for the silo, it cost me forty cents and four mills a ton, to cut it and put it in the silo, counting a man at $1. a day, and a team at $1. a day. I drew it to the scales and weighed it. My ensilage corn was all Southern corn, called B. & W., and it averaged 19 and 47-100 tons per acre, after being wilted three or four days. When it was wilted one or two days, it weighed twenty-one tons to the acre, by actual weight, so that I think the crop, if cut and drawn green from the field, would have weighed from 25 to 28 tons to the acre; many of my friends put it at about 30 tons. I frequently found stalks weighing nine pounds, which, after standing two days, weighed about six.

Cost of Ensilage in the Pit.—The cost of my ensilage in the pit was one dollar a ton. The way I account for the variation between myself and Mr. Smith, of fifteen cents, is that he put in corn that did not weigh as much to the acre. Fifty pounds of ensilage is as good for my cows as twenty-five pounds of hay. I get as good results and, in considering that, you must bear in mind that the ensilage has been somewhat dried out.

Southern vs. Northern Corn.—I was a little like the rest of the farmers, somewhat conservative. I did not like to admit that there was anything better than Northern corn. I planted a little of the Northern varieties last summer (1887), and I had to do as the rest of us did, go into the field and cut it and feed the cows during the summer, but I cut and put into a silo about eight acres of that small corn. I did not weigh it; I don't think there were five tons to the acre, and it succumbed to the drouth and was considerably less than half a crop, while the other was a good full crop of twenty-five tons to the acre after being wilted. Now, I found a large shrinkage in the milk when I came to feed that Northern corn; it did not give as much milk as the Southern corn. I had no difficulty in getting the Southern corn to ear heavily. I did not commence cutting until late; I waited until it did ear, every stalk having a well-matured ear, and many of them two. I really think that on that corn planted early, I had as many bushels of ears of corn as on any variety of corn that I have ever planted.

Discussion

MR. NORTH.—How did you plant your ensilage corn?

MR. AUSTIN.—I planted it in drills. Dropped it in rows, three feet eight inches apart, three kernels twenty inches apart in the row.

THREE YEARS' EXPERIENCE WITH SILOS.

By H. S. WEEKS, Waukesha County, Wis.

Sixth Paper.

Fodder Corn and Drouth.—My own experience with the silos built on my farm in 1880, covers but three years, each of which has been one of climatic extremes, when all farm crops in this region have suffered more or less. You all remember the season of 1885, with its exceptional rainfall, whereby all vegtable production was watery and immature, and had to be harvested under most adverse circumstances. My fodder corn, however, attained an enormous growth, and was a great success, as we then were accustomed to fill our silos. It was succulent, surely, but that was the main object in view, and, if it required more grain food to supplant its use, that was to be had cheap enough. The next year of extreme heat and drouth, the season of 1886, you also have not forgotten. Grain and forage crops, as a rule, were a partial failure, and my fodder crop was a light one, as compared with the previous year, and did not entirely fill my silos; but in feeding qualities it produced the best I have had.

Success With Southern Corn.—I planted the Southern ensilage corn entirely, and got it in late, say the 10th of June. The ground was well manured, the crop well cultivated, and, though it grew slowly at first, yet it attained a good height, was well eared and reached a good stage of maturity early in September. It was cut and put into the silo without wilting, and much more rapidly than is the rule now, but when opened it was a splendid feed, of a rich and sugary smell and taste, a little of it going farther than double the amount the year before.

Interesting Experience.—The summer of 1887, with its unprecedented drouth and heat, covering almost the entire growing season, is fresh in the minds of everyone. My Southern corn, planted about the middle of May, on land heavily top-dressed with manure, thoroughly worked in and pulverized with the disc harrow, the seed bed being made as fine and mellow as a garden, was doing finely and promising a large yield until stricken by the memorable wind storm of August 9th, which broke the drouth, and at the same time broke down my tall ensilage corn. It looked like a pile of jack-straws, and required about as much skill to cut and pick up as is necessary in that boyhood game. I saw no way but to put it into the silo, if I would save it, though it had not yet reached the proper stage, the ears being hardly formed. I cut and put in large stooks, thinking thus to improve it for ensiloing, but considering the torrid atmosphere in which it was grown, many leaves being curled up and withered, I am doubtful if it was the part of wisdom. I find the ensilage thus made, in the bottom of my silos, much inferior to that put in later from Northern corn, well eared. I was obliged to fill my silos very slowly, owing to the time required for the fodder to heat to the proper degree for making strictly sweet ensilage, and that

was my objective point, that year, at all hazards. It was accomplished, and, though not all as perfect ensilage as I could have wished, yet it furnished me with feed for fifty head during the winter, and all from the product of about 18 acres.

The Silo in Time of Drouth.—In giving you, briefly, the history of my three years' experience with the silo, I wish again to call your attention to the fact, which I at first stated, viz: These have all been seasons of more or less disaster to farm crops, the last one more especially, when hay proved almost a total failure, thereby compelling so many farmers to part with valuable stock for "a song," entailing untold losses, present and prospective. How has it been with those who have depended upon the silo to feed their cattle? Take my own case as an example. I have pursued the even tenor of my way, regardless of flood or drouth, sure that by this system I should have feed enough and to spare, and have not turned my stock out to pasture until June 1, either year.

Lessons From Experience.—Some of the lessons which my experience has taught me are: First that it is wise to plant a part of the Southern ensilage corn and part of some acclimated Northern variety, because, in our varying seasons, we are surer of the Northern corn reaching maturity. If planted early, and the season is favorable, the Southern corn will mature ears to the partially glazed stage before frost. On the other hand if anything prevents early planting, and the season is wet and cold, it will not reach that condition. Most of you, whose experience with the silo has been obtained during the past two years of abnormal heat and drouth, do not realize this. There is no season in this latitude when the Northern corn will not mature sufficiently to make the best ensilage. Another point which my experience suggests is, that if the crop is well matured when properly put in the silo, and protected from the air till used, it will make equally good feed if it is not heated to the point which makes what we term "sweet ensilage," meaning by that almost entire absense of acidity in taste and smell. I would not have you infer from this that I would go back to the ensilage as first introduced, which was sometimes not inaptly called "*sour krout*," and in which water was the larger part—far from it. But it seems to me that a middle course answers well. Under some conditions, it is inconvenient and more costly to fill the silo as slowly as is required to make strictly sweet ensilage, which I can not discover that cattle eat with any more relish, or with any better result, than that *slightly* acid. The nature of the season and the condition of the fodder should govern somewhat in this matter.

The Silo in Farm Economy.—I believe the silo is destined to play a very important part in the farm economy of the future; that it will be utilized to preserve all our forage crops, not only for winter, but for year around feeding, and that the days of pasturing on high priced land are substantially numbered. We have got to face low prices for all farm products, and, as with the manufacturer, so with the farmer, the only way to meet it is to cheapen production. The silo opens the way for the dairyman and stock feeder.

THE SILO IN EAU CLAIRE COUNTY.

By S. E. COOLIDGE, Eau Claire County, Wis.

Seventh Paper.

How I Planted the Corn.—My attention was first called to this subject by Mr. W. D. Hoard, in the spring of 1886. He came to our place (Augusta, Wis.), and gave us a lecture on the advantages of fodder corn over field corn, for feeding stock. Acting on his advice, I procured two sacks of the B. & W. seed corn, and planted six acres; used as near as I could ½ bu. of seed to the acre. I used a Rockford planter and planted in drills, 3 ft., 10 inches apart. I dragged the ground until the corn was about six inches high; then cultivated it three times with a two horse sulky cultivator. The corn grew to an enormous height, and was so thick on the ground that a man could scarcely walk through it. In August we had a storm that blew it down badly; after this the tops of the corn turned up, which made the stalks very crooked, and this made it very hard to shock.

My First Silo.—I wrote to Hon. Hiram Smith to send me a plan for a cheap silo that would hold 100 tons, and his method of filling the same. He sent me a plan by which I built my first silo. It was 16 ft. square and 16 ft. high, and cost me something less than $50, including both labor and material. I only built three sides, as I used my new barn for one side.

Filling and Feeding.—We cut and put into this silo 3½ acres of the fodder corn, according to directions. I covered with tarred paper and boards and then put on about six inches of clay loam. We opened this pit the first of December, and, with the exception of a little in the corners and around the sides, the cattle ate it with a good relish and did well on the two feeds a day of ensilage, and one of hay, with what warm water they wanted to drink.

I fed no grain except to milch cows; think I fed about 50 head for 90 days from this one pit. There were no ears on the corn; it was planted too thick for ears to grow. I was so well pleased with the results, that last year I planted twelve acres of the same kind of feed. I planted on part of the field 12 qts. to the acre, and 10 qts. on the rest of the field. The corn was all well eared and good roasting ears when I put it into the silo. I was best satisfied with that part where I used the most seed; it was the best eared and the best matured. During the severe drouth of August, we fed out two acres of this corn to our milch cows with good results.

My Second Silo.—I built another silo 18 by 32 ft., and put a partition through the center, making two pits 16 by 18 ft. each, and 16 ft. high. Into these three pits I put ten acres of our fodder corn. We covered our pits with tarred paper and boards, and over these put marsh hay.

Difficulties Encountered. — We opened our first pit October 28; found the ensilage good up to the paper, but the same difficulty we had last year

viz: Some in the corners was spoiled. We fed 63 head of cattle for 60 days from this pit, with one feed of hay each day. On the first day of January we opened another pit, and fed 60 days, with one feed of cornstalks each day. March first we opened our third and last pit, and found it badly damaged; in fact it was entirely spoiled all around the corners and sides. My silo is two thickness of boards on inside studding and tarred paper between, well lapped. Sided on the outside with drop siding, except the last pit, which had no siding on two sides, one being next to the barn and the other next to another pit.

But it was spoiled on these two sides just as badly as it was on the two outsides. This part of my experience is not very satisfactory. If any one has had a like experience, and has discovered the cause of this damage around the sides and corners, I would like to know if he has discovered the remedy and what can be done to obviate this great loss.

Cheapest and Best Feed.—Even with this loss, I consider it the cheapest and best feed that I have ever fed to cattle. They prefer it to the best hay. No grain was fed except to our milch cows; they gave as much milk with the extra feed of cornstalks as they did when they were fed hay. My stock has all done well on this feed, and some of my dry cows are getting fat, so much so that I have sold five for beef in the last month. Horses like it, and hogs will eat it.

Discussion.

MR. NORTH.—I would like to ask if anyone has ever built a silo and plastered it inside?

MR. GOULD.—Yes; they are very common, but not as good as a silo built of two thicknesses of boards, painted with coal-tar and rosin on the inside. The plastering is of no advantage, and much more expensive.

MR. GATES.—What proportion of rosin?

MR. GOULD.—You will have to guess at that. A lump as big as your head, in four or five gallons.

MR. GATES.—Do you know anything about this loss in the corners?

MR. GOULD.—The whole trouble of the molding along the side and the corners, comes from the fact that we tread it so hard that it does not heat up as fast as in the body of the pit. The remedy is to tread it a little in the corners and leave it at night heaped up right in the center. The third day, when we get ready to fill again, throw this corn from the middle into the corners; that does away with the whole bother. Have your carrier carry as near the center of your pit as you can, and distribute through the day, and then the last three or four loads heap in the center.

QUESTION.—Don't you tramp down the corners at all?

MR. GOULD.—Not as much as we used to; we tramped it too much, and it pressed out the air so it did not heap up as well. You want to tramp it when you fill again, after it settles.

MR. AMES.—How are you going to cover your ensilage next year, Mr. Gould?

MR. GOULD.—After the experience I had last fall, I shall abandon the tarred paper and the boards wholly next year. After filling the silo and leveling it off nicely, I shall leave it until the ensilage shows 125 or 130 degrees. Then I shall simply put on a load or two of marsh hay, or wilted hay—anything of that kind—tramp it down, tuck it down on the sides and throw on a few old boards. Now, the heat coming up with this light weight, will mat it together on top and keep the air out.

MR. HIRAM SMITH.—The first silo I filled, I put on plank and weighted it heavily with stone, pretty heavy business. The next year I put on tarred paper and boards. We found that the question of weight cuts no more figure than it does in the wood pile. Last year I simply put tarred paper on the ensilage corn. Then I had a stack of corn I wanted to save through the winter. I ran it through the feed cutter because I could do it cheaper than to put it up with the fork, and put it on top of the paper and it was all that was necessary to cover it. The ensilage was perfect, right up to the sides. The paper makes good fuel to heat the water in the winter for the cows.

MR. GOULD.—I want to ask Prof. Henry one question: From the present status of the ensilage question, shall we abandon that and go back to the old way of curing our fodder corn?

PROF. HENRY.—I do not think I would be wise or politic to stand up here and face the experience of so many successful farmers upon a successful method. Some one has said, I don't know but that John Gould, when a professor and a cow differed, would go with the cow, and he was right. Science is simply the unfolding of truth, and the road is often long and tedious. Sometimes the practical man gets there long before the scientific investigator, and the farmers have found out more about the silo than the experiment stations, simply because the experiment stations have had one or two silos while the farmers have had hundreds. We, at the Experiment Station, believe in ensilage as an adjunct to the dairy. A farmer who feeds a steer has no use for a silo, It is the grand fodder crop that makes the silo what it is. If you haven't a large crop to feed, you can't have ensilage or fodder either. Plant some kind of Indian corn and you will not be very far from the truth. Remember our results have largely come from two dry years, and a difference in circumstances may make considerable difference in results in the future.

ENSILAGE FOR FATTENING CATTLE.

By C. V. GUY, St. Croix County, Wis.

Eighth Paper.

Cost of the Ration With Hay.—As these gentlemen have nearly all talked about the advantages of ensilage as a feed for milch cows, and have largely exhausted that subject, and a good share of my thunder also, I shall be obliged to confine myself to my experience with ensilage in the matter of fattening steers. Last winter I turned over forty-six head, I think, of fat steers, and, in order that you may have the better idea of what I may say in regard to this matter of feeding, I will give you briefly what it cost me last year to feed my steers from the time that I put them up until I sold them. The daily ration for

them was 16 lbs. of hay at $8 a ton, 8 lbs. of corn stalks at $4 a ton, 6 lbs. corn meal at $12 a ton, 3 lbs. of ground oats at $68 a ton, 4 lbs. bran at 40 cents a hundred, making a daily ration at a cost of fifteen cents and four mills, as I figure it.

The Profit — That there was any money in feeding cattle that way, is problematical, slightly so at any rate, but in order to make my two ends meet, I bought the cattle early in the fall; I had considerable fall feed and they did very well for a month or two on that, so that the expense of feeding them for that time was not over twenty-five cents a week. After that it was some fifteen cents a day. Any one knows that it would be entirely impracticable to make fifteen cents a day on beef, but in the fall I bought the steers for about two and a half cents a pound, or a little less. I commenced feeding some grain about the 25th of November, and, during the feeding of that, they had made about one and one-half pounds a day. The subsequent one hundred days feeding, at fifteen cents a day, would be $15. Buying them at two and a half cents a pound and selling them for four cents made the steer that cost me originally $25, sell for $25 plus the increase in weight of the steer at four cents a pound, and the one and one-half cents a pound for its original weight, made me about a dollar apiece for feeding my cattle and selling my provender, making a sale of the coarse feed or roughage during the winter.

About My Silo.—I want to speak about my silo. First, as to the amount of corn planted to the acre, I notice some are recommending as high as fourteen quarts. I found the best results from six quarts. I did not want to plant it any thicker than necessary to get a good supply of ears, and I had more stalks with three ears on the stalk, B. & W. corn, than there were without any. I think I got very much richer feed from this mature corn than if I had planted it thick. I figured out, last spring, the amount of seed to an acre, and found that, by putting four kernels to the hill, it would take four quarts to the acre, and the B. & W. corn being considerably larger than our native corn, made about six quarts, or about one kernel in a foot, planted three feet ten inches one way, and four kernels in a foot the other way.

Building. — One word about building the silo. If any of you propose building, be sure and get it strong enough. Some of my neighbors have failed because they did not put material enough into the the walls of the building. I put in two by eight scantlin, sixteen inches, sixteen feet high; if you put in less than that, I am afraid you will make a failure. As a general rule, make your silo strong enough to hold when filled with wheat to the very top; then I think you are safe. Another word, as to the partition between the two bins of the silo. One of my neighbors thought that when he filled the silo and got it pressed down, it would stay put like a bed of hay. Consequently he put a thin partition between the two bins, and when he came to take out of one side, the pressure of that remaining forced his partition out, and he lost heavily. Another point: Do not bunch your corn up in gavels when you cut it. Let it lay down one row at a time, and dry out thin; you will find it works better. The better the corn is wilted the better ensilage it makes.

Cost.—My silo cost me something like a dollar a ton. If you will build a large silo, holding over two hundred and fifty tons, it will not cost as much. I would not advise any man to put in a silo as

small as fifty tons. When you come to figure up the expense, the necessary strength of the walls, and all other considerations, the proportionate cost to the square foot is very much larger in your small silo, as you will see.

The Ration With Ensilage.—Our feed of ensilage has been thirty-three pounds to the steer. They were just about as even a lot of steers as I ever had. Thirty-three pounds is just about a bushel, well packed down in a basket, and that is what they had every day, with five pounds of hay at $9 a ton, six pounds of corn fodder at $4 a ton, ground corn with the cobs, four pounds, at $10 a ton, and ground wheat screenings at $12 a ton, making a daily average of just ten cents, whereas last year it cost me fifteen and four-tenths cents. It is too early in the season to tell what the aggregate gain is, but I can simply say that the feeding is very satisfactory. There is another point: Last year I was feeding ground oats with my ground corn. For stock less than two years old, I think that would be a good ration, but for stock three years old that is going to be put on the market this spring, as far as I am at present informed in this matter, I am getting just as good results from grinding corn, cobs and all, as I was on ground shelled corn and oats. I think my steers are as fine as they were last winter.

Discussion.

MR. NORTH.—Suppose there are two farmers who have joined in filling their silos, using the same machinery, and a storm comes and catches one of them and it is two or three days before he can get to work again?

MR. GUY.—It will not hurt the ensilage; all you want is to let it settle and heat. You will find the ensilage will settle so that, when you come to go upon it, it will feel like ashes and sink under your feet. Tramp it down thoroughly, and it will do no harm. After it has begun to heat, tramp it down every day and you will be surprised to find how much it will settle. I consider it necessary to have it tramped thoroughly, and in filling a silo of seventeen or eighteen feet it will shrink four; if you keep the tramping down on top continued, I apprehend there will be no difficulty if you wait a week before you put on more. After it was tramped, the heating did not increase in mine.

MR. MCCREADY.—Did the ensilage seem to have any effect in the way of rotting the inside boards?

MR. GUY.—It has not yet. It swelled them up so it made them very tight. I put on such boards as I did in boarding the barn.

MR. MCCREADY.—Did you paint them?

MR. GUY.—No, I did not; I didn't have time. I think perhaps it might be better to put on a coat of paint, but they were nailed very strong, and I had no difficulty about their warping.

MR. KRAUSE.—If there comes a storm, which in our part of the country lasts sometimes a week, and the ensilage corn is left out in the rain during this time, will it go into the silo and come out all right?

MR. GUY.—If you let it get dry, and put it in dry, it will. If you put it in wet, I think it would burn.

MR. KRAUSE.—Then, you advise not to put it in unless it is dry?

MR. GUY.—Certainly not. I would rather haul it out and feed it to the cattle, if I had to do that, than lose it.

MR. GLEASON.—I would like to say one word to substantiate the speaker in regard to feeding his steers. I have had

experience in feeding cattle ever since I was old enough to feed them, and always fed corn, ground up, cob and all, and consider it the cheapest food, and the best to feed to fattening steers in the winter.

MY EXPERIENCE WITH ENSILAGE.

By JOHN URQUHART, Columbia County, Wis.

Ninth Paper.

Canned Fodder.—My experience with ensilage for two seasons has been very satisfactory to me, and beneficial to my stock in having nature's natural green food to feed through the winter, and the stock appreciate that kind of food. We are advised at our institutes to raise and can fruit for our families, and I think it is good advice. In the silo we have a great canning institution, or factory for getting good and cheap food for our stock.

Possibilities of Ensilage.—The possibilities of this food in the present and future no man can tell. Just think of a man wintering his stock cheaper than he can pasture it in summer. Ensilage has revolutionized the dairy interest in Wisconsin, and the beef interest, too, so that we can almost compete in cheapness of food with the western ranche. I do not know of any other food so cheap that we could substitute for ensilage.

Forced to Build a Silo.—When I built my first silo, John Gould had not yet escaped from the stone silo in Ohio, to inform us how to make sweet and sour apple pies and sweet and sour ensilage. It is an old adage that necessity is the mother of invention. Necessity was the mother of my silo. If I had not been compelled by scarcity of feed, it is doubtful if I would have built a silo yet. No feed meant no milk, no butter, and you all know when a man has a herd of thoroughbred dairy cattle that would never do, for you must feed to make them give milk to make butter, whether crops grow or not. I never had seen a silo until I built one and filled it according to book instructions with field corn, nearly matured, and it made the best ensilage that I ever saw. I think forty lbs. of this ensilage was equal in feeding value to fifty lbs. of the ensilage I had this year. I have fed ensilage to cattle, horses, hogs and poultry, with the very best results.

How I Manage the Crop.—In planting ensilage corn, I use a horse planter. I put a boy on and he uses the lever nearly as fast as he can. I plant about eight quarts to the acre; this year I got about 25 tons of ensilage to the acre. I use a spring-tooth cultivator, and find it best for corn; use Belle City feed cutter, and it gives me the very best satisfaction. I draw corn to silo on trucks, with long reach, and wood or flat hay racks. I cut in gavels of about forty to fifty pounds each, with butts out from the standing corn. I drive team alongside of corn, then throw gavels on trucks. This saves walking up and down plank, so often, behind wagon as some recommend. I haul

and cut about 30 tons per day, then let it heat up to 125 to 135,° filling one day and letting it rest until ensilage gets hot enough; keep filling in this way until the silo is full, then cover with tarred paper and straw. Be sure and have your silo air tight, and your ensilage will come out sweet and all right.

Cost Six Acres Ensilage.—I will give what the ensilage cost me per acre in the silo. The following figures are for six acres that I raised last season: Rent of six acres, at $4 per acre, $24; plowing six acres, at $1.25 per acre, $7.50; harrowing, three times, $3.75; planting, one half day, two men and team, $2; cultivating, four times, $7.50; making cost of growing and getting corn ready to cut, $47.30. It takes seven men and four teams to run cutter. Two men cutting and loading in field, $3; two men and two teams, drawing, $5; two teams and one man on power, $3.75; one man feeding, $1.50; one man spreading ensilage, $1.50; oil and incidentals, $1, making $15.25 per day for hauling, cutting and filling. Add interest on machinery, $10, and you have a total cost of growing, cutting and putting in silo, six acres, or 150 tons, $133.55, which will make your ensilage cost you 89c. per ton.

Fifty pounds per day is an average ration for a cow, with the usual meal ration; $4.05 will feed a cow ensilage for four months. It will cost $18 to feed a cow with hay for six months, leaving a balance of $13.95 in favor of ensilage, which is quite an item if you have 30 or 40 cows to winter.

I have filled one of my silos with ice this winter, making it do double duty. The silo has come to stay with me.

EXPERIENCE IN TAYLOR COUNTY.

By G. W. ADAMS, Taylor County, Wis.

Tenth Paper.

Cheap Forage.—My experience with the silo is only of one year's standing. While attending the farmers' institute held at Medford, during the early part of the winter of 1887, the question of cheap forage was discussed, and how best to preserve it so as to obtain the greatest feeding value for the time and money expended. With hay at from $10 to $20 per ton, it was out of the question with us farmers of Taylor County to think of keeping stock through the winter. In fact we did not like the idea of paying out so much money every year just for the pleasure of keeping stock. While listening to able discussions of cheap forage, and the silo as a means of preserving the crop in the best possible manner, I thought I saw an opening in the clouds, and the light of intelligent farming was being spread abroad in the land. The farmers of Taylor County had discussed the unprofitable business of keeping stock on hay, and many of them had concluded that it did not pay to keep stock when it required the hay from three to four acres to feed a cow through the winter.

Many of our farmers sell their cows in the fall for from $20 to $25 per head, and buy again in the spring, paying from $30 to $40 for the cow, letting her run in the woods all summer, costing nothing for feed. The farmer will receive from $15 to $20 in butter and milk during the summer from his cow, but it will cost $40, at the price of hay, to keep that same cow through the winter.

Now, what we need is a cheap ration to feed during the winter months, and this I believe the institute offers us, in the growing of corn, and in teaching us how best to preserve it in the silo.

My Corn Crop.—Last spring the question of seed corn was of great importance to me, and I finally concluded to plant the common white dent, which proved to be a great success. This I planted by hand, in rows, 3½ feet between the rows, and from 4 to 6 inches apart in the row. I commenced planting the corn about the 25th of May. This was at least a week too late, on account of the early frosts in the fall. I commenced cutting, to feed the stock, the middle of August, on account of the drouth. I fed the stalks whole. The cattle did not eat the stalks very well, and I think it was on account of the chinch bugs, which were quite numerous on the stalks at that time. The cows gave a slight increase in the flow of milk while being fed the whole corn.

My Silo.—My silo is constructed as follows: 26x24 feet, 14 feet posts, frame. Divided into two pits, 12x13 feet. Built on east end of hay barn. Used 2x8 studding, two thicknesses of common inch boards for outside, and one thickness of common boards and building paper on inside of studding, and filled in between studding with saw-dust, extending roof of barn over silo. Filled in with six inches of earth for floor.

Filling. — Commenced cutting, and filling silo, the 7th of September. Weather was not favorable; too much rain. Corn had commenced to dent when cutter was set in motion. The last planted was the first cut. This was unfortunate, as there was at least a week's difference in the time of planting, and six days' difference in the time of cutting, owing to location of the field and condition of the weather. I wish to call attention to this more particularly, as that part of the ensilage planted first and cut last, was superior to the other, planted last and cut first. I tried to cut corn and lay in heaps to wilt, but this method had to be abandoned, as it made too much work in spreading, when wet. Would cut corn for two days in each pit, and allow the ensilage to heat up to 120 degrees. As much as two-thirds of the field planted last, was cut and run into one pit.

The corn from 4½ acres of ground was cut into the silo, and completed the 17th day of September. A heavy frost on the 13th of September did some damage to the last corn cut, which was evidenced by small patches of mold in the ensilage in that part filled after the frost.

Farmers Incredulous. — The silo was left uncovered for a week, until it showed a heat of 130 degrees; then covered, first with tarred paper, and then with common inch boards. About two tons of old marsh hay were thrown on the top of the boards, and this well tramped. The silo was little more than half filled, and contained about 90 tons of ensilage. While filling the silo, hundreds of farmers and business men of Taylor County, and many from adjoining counties, visited the premises, and inspected the process of filling the silo. I was informed by a large majority of the visitors that I would have a large pile of manure to haul out of the silo in the

spring; that unless I threw in lots of salt, it would not keep. Others would ask, if I knew what I was doing; that I was wasting my corn crop; that it was too bad to waste such a good crop, &c.

Opening the Pits.—I assure you, gentlemen, that it was with a great deal of uneasiness on my part that, on the 9th of November, I uncovered one-half the pit filled last. On the south end, about 6 inches of the top was moldy, but near the center of the pit there was not more than two inches of mold on the top.

A very little rot and mold on the outside, constituted all the waste in pit No. 1. The dry stock ate nearly all the moldy ensilage, so that the waste was almost nothing. On opening pit No. 1, thermometer showed 135 degrees. After remaining open some time, the heat grew less, so that the temperature remained at about 100 degrees. I fed from the top, and used one-half the ensilage in first pit. This was about the middle of December, and the weather was quite cold. In feeding ensilage from second half of pit, I did so by taking it out at the end, and placing a small prop under end of boards covering ensilage, to keep the cover from falling in. The ensilage remained fresh, and no danger from frost was experienced. January 15th I opened second pit. Temperature 140 degrees; from 6 to 8 inches of mold and rot on top; sides considerably rotted, and but little mold; ensilage more watery than first pit. All excepting the top and sides near the boards was good. At a fair estimate, there was three times as much loss in second pit opened as in the first. This I attribute to the corn being much greener when cut, and a few loads lying in heaps during a rain storm, and not thoroughly dry when put into the silo.

Effects of Feeding Ensilage.—At the time of opening the silo, I was milking eleven cows, all strippers except three. Owing to the drouth and short feed, they were not giving more than half their usual quantity of milk when in good feed. Within two weeks after I commenced feeding ensilage, the strippers increased their flow of milk one-third, and the other three increased one-half. This was a very pleasant surprise to me. I was giving each cow 4 lbs. of bran a day, at the time I commenced feeding, with what hay they would eat. The feed of bran continued the same while feeding ensilage. I feed to each milch cow per day 40 lbs. of ensilage in two feeds, morning and night, with 12 lbs. of marsh hay at noon. I have fed from this 4½ acres of corn, from November 9th to March 12th, 26 head of cattle as follows: 11 milch cows, 6 two year olds, 8 calves, and one three year old bull. The dry stock received nothing but ensilage during this time, except the old hay used in covering it.

What the Ensilage Cost.—The cost of this ensilage did not exceed $100, including rent of land at $5 per acre. As soon as the ensilage gave out, I doubled the feed of bran, giving 8 lbs. per day to each cow giving milk, and all the good timothy and clover hay she would eat up clean. During the four months while feeding ensilage, the cows giving milk were costing 3 3-5 cents for bran; 6 cts. for hay, and 2 2-9 cts. for ensilage; in round numbers, 12 cts. per day, each. Since the ensilage gave out, have been feeding my milch cows at the following cost: Bran 7 1-5 cts., and hay 26 1-4 cts.; in round numbers, 34 cts. per day each, or at an additional cost of 22 cts. per day.

I am now milking ten cows. This represents an additional cost of $2.20 a day. This does not represent all the loss, for

since I have stopped feeding ensilage, the cows have been giving less milk, and it seems impossible to check the shrinkage of milk under the present method of feeding.

More Silos Will Be Built.—I am *more* than pleased with my experience with the silo and ensilage for the past year, and shall try to plant ten acres of corn for ensilage the present year. The farmers of Taylor County, who have visited my silo this winter, and witnessed some of the benefits growing out of the silo and ensilage, are warm in their praise of the good work being done by the institute workers for the farmers in Northern Wisconsin, and I do not doubt that a number of silos will be built in Taylor County, the present year.

EXPERIENCE IN WINNEBAGO COUNTY.

By W. B. VAN KIRK, Winnebago County, Wis.

Eleventh Paper.

How We Were Converted.—We were converted to the belief that the silo was a practical thing, at the institute held at Ripon last winter, under the preaching of Messrs. Gould and Austin. Prior to this time, we had thought of it in a sort of vague way as something out of reach of the average farmer—something that might profitably be adopted by men of means who farmed it in a strictly scientific way, but not likely to pay the common farmers who are obliged to rustle for a living. It was, however, made plain to us there that any man of average intelligence whose credit was good for $100 worth of building material could build, and successfully operate, a silo, even without one cent of cash to put into the enterprise. We can think of nothing for which a farmer can better afford to run in debt. Acting upon this conviction, we tore up the floor of a bay in one end of the barn, reasoning that we could easily do without the room for hay, as the ensilage occupying the same space would go farther than the hay would. Setting heavy oak posts on the two sides of the basement not walled in, and laying scantling againt the wall, we commenced at the bottom and sheeted up to the plates of the barn with two courses of common boards, with tarred paper between, making a comparatively air-tight bin, 14½x29 feet, inside measurement, and 24 feet deep, capable of holding something over 200 tons of ensilage. It took seven thousand feet of lumber and studding, which, at $11 per thousand, cost us $77. Iron rods to strengthen barn beams, nails and building paper brought the expense up to not far from $95.

Building.—The work of building we boys did ourselves, and there is not the semblance of a mechanic among us either. It took us the greater part of a week to do it, although in all probability two good mechanics would have done it quicker. Perhaps we should have cemented the bottom, but we did not.

A plank partition through the middle, dividing it into two pits, finished the structure and, getting the cutting machine and power in place, we proceeded to the filling.

Filling.—Thinking to be especially economical, we collected a lot of harvester chains, and made a carrier of our own. We managed to get through the season with it by dint of a good deal of fixing but concluded that, after all, it was not very good economy. We believe there is such a thing as squeezing a dollar harder than there is any kind of use in —until, as Mr. Louis expresses it, the eagle screams to the Godess of Liberty for protection. Every farmer has, or ought to have, business enough of his own, without entering into manufacturing.

Kind of Corn Raised.—We raised about 18 acres of the big Southern ensilage corn, that managed to weather the drouth and defy the chinch bugs. Not that the bugs did not tackle it, for it was alive with them, but it somehow managed to grow and thrive in spite of them while the native corn planted in the same field, shriveled up and died.

Method of Drawing.—Our method of drawing and filling the silo is not unlike that usually practiced. We find it pays to save lifting and carrying, so far as possible, for the stuff is heavy. Taking the wheels off an ordinary wide-wheeled farm wagon, we put them on the hind axle, and to this coupled the front trucks of the manure spreader. Putting a flat rack upon this, we had a low and convenient rig. We never tried walking up a cleated plank with our arms full of cornstalks. It may be easy enough, but it looks as though it would be up-hill business in more than one sense of the word. Our plan is to drive along by the side of a row of gavels —one man hands them up at the side while a second loads. In unloading we use a team with a tackle, rolling the entire load at once off on a rack or platform close to the cutter. Then, while one man is feeding the load through the machine, the wagon goes for another. Two loads per hour is the ordinary rate with us.

Time in Filling.—Doing almost the entire job ourselves, and at such times as it pleased us to work at it, it is hard to furnish any definite account of what it cost per ton to get it in, and more especially so as we have become so used of late to working for nothing and boarding ourselves. It was just about six weeks from the time we commenced until we put the cover on. We estimated, when we got through, that we had worked about half the time. For days we had it filled within a few feet of the top, but couldn't seem to make much headway, as the stuff settled about as fast as we put it in, which, by the way, was not very fast, for we were getting a little tired and couldn't help stopping to think occasionally how our friends would laugh at us if it should all rot down. We had urged them in the spring to plant some fodder corn, even if they couldn't build a silo, but most of them thought that they had not room on their farms for the corn, and couldn't afford the silo. Some of them couldn't spend time to go to the institute last year, but took time this year. Most of them had room to sow a little wheat for the chinch bugs, and some of them are well enough off now to buy our marsh hay to feed their stock on while we feed our ensilage.

The Pits Opened.—We covered the silo about October 5th with paper, boards, and about a foot of dry cut corn stalks. The boards, we have since concluded, are a nuisance. About the 28th or 29th of October, when the cows had eaten the

last of the green stalks saved out, we opened one pit and found it all that we had hoped. It was not absolutely perfect, for down each corner was a streak, more or less extensive, which was damaged and unfit to feed. We estimated it at about 2 or 3 per cent. of the whole. This has been thrown out in the yard and much of it eaten by the horses, after all, and without any apparent bad results.

Feeding.—From the first of November until about ten days ago, we fed 31 head of cattle, besides giving a little to the horses. At present we are feeding twenty-five, and are enjoying the prospect of having enough left in the spring to feed the cows through a drouth next summer, should one occur.

We have not fed it to the entire exclusion of hay, as some have, because the stock seem to relish a little something dry, even after they have eaten all the ensilage they want. On the whole, we are well satisfied with the results of feeding it. The stock have done better than they ever did when wintered on hay, and, if the use of land on which to raise forage crops is worth anything, they have certainly been wintered much cheaper.

How to Get Land Enough.—While it would seem that the raising of hay at the rate of 1¼ tons per acre, as we are doing in Wisconsin, virtually solves the question of eternal poverty for the farmer, we hope, on the other hand, that the raising of 20 tons of fodder corn per acre, and this preserved in the silo, will yet help us to a solution of the vexed question, how are we boys to get land enough in Wisconsin to make a living from? Certain it is that we shall never be able to buy large farms, and pay for them by working them in the good old way. Our fathers made money once on a time, but we need not expect to do it in the same way now. By a more intensified system of farming, as it is called, we may be able to get a respectable living if we don't own all the land that adjoins us.

Discussion.

MR. MORRISON.—What are you selling the marsh hay at to your neighbors?

MR. VANKIRK.—From $6 to $10 a ton, and that we took in stock because they didn't have money to pay for it, and we put the stock in the barn, and fed them on ensilage.

MR. COLE.—There is one defect I have found in silos. They are boarded right up on one side and then turned and boarded on this side, and as soon as pressure comes there will be a large crack, which will let in the air and spoil the ensilage. Now that can be remedied by boarding up four or six feet, and then turning the other way.

MR. BENDER.—I, in building my silo, followed that plan, but with every course of boards, I cut right down into the half of the board, and then in the next course I cut into the opposite half; then, after the silo was boarded up, I took some two by fours, and put on the back side of these boards and spiked them right to that, and fixed the corner every time.

PRES. W. I. CHAMBERLAIN.—I want to say just a word to those why are going to begin the ensilage business. Order your seed corn now. We in Iowa ordered two months before we wanted it, and we didn't get it so as to plant in time. We planted our field corn the 5th and 6th of May, and another field the 11th and 12th of May, and our ensilage corn did not come so we could plant the first till the seventh, and the other until the 13th and 14th of June. Well, it would not mature with us; we had to cut it in August to get it away from the

chinch bugs. The ensilage corn grew a crop, and it was the only thing that did. Our meadows did not have a spear of grass on them. If we did run the mowing machine through them, nothing less than a fine toothed comb could find any hay there. Another thing: If you are going to build a silo, see that your machinery is there for six weeks before you begin. We were greatly delayed in that way.

Where we put the ensilage in right green, or wilted a day or two, it was all right, but where we put it in dried four weeks, even though we tried to mix a little green through to start the fermentation, yet it charred, burned so it was not so good. That was the only trouble we had—except that it rained three inches all the time the corn was struggling to grow, and then it rained nine inches and twelve one hundredths while we were struggling to put it into the silo; but in spite of all these difficulties, our thirty acres of corn, half grown, carried a little more than a cow to the acre for one hundred days of the very coldest weather. We fed it to about one hundred cows and we fed it during thirty days, when the thermometer averaged, twenty of those days, nearly fifteen degrees below zero, when, you know, cattle eat a great deal more to keep up the animal circulation.

Now, one or two point briefly: As it was, that thirty acres saved us about $450 worth of hay, as I figured it; that is, half grown as it was, worth $15 an acre to us.

Now, I would not dry the fodder more that one day, or at most two, especially in this catching weather; beyond that, you lose in the cutting, and more too. We found it took three times the power and grinding to cut that dried fodder that had stood out in the rain, with dirt scattered all over the stalks, than when we had drawn it quickly from the field, when it cuts almost like asparagus. Another thing—you want a dry time to put it in. I think if corn is once wet you cannot dry it, anyway.

Now, the question with us in Iowa is, will the silo pay in connection with cheap ten dollar land, that is as fertile as any land that lies outside, that will raise two and three tons of clover and timothy hay, and we had figures at the institutes of men who put up hay for fifty cents a ton. Where you can do that, I doubt whether the silo will pay, but on high-priced land, especially where it is not very fertile, I have not the least doubt that the silo will pay abundantly; but build the silo well, plant early, let the corn cure, and get your machine in time, put it up right and it will be all right. Even under the exceedingly adverse circumstances which we put it up—everything against us—it paid us.

MR. NORTH.—How should the partition be put in?

MR. HIRAM SMITH.—It can be a temporary partition, putting in the planks wherever you want it—putting them into cleats. They are carried up as your silo is being built, one or two planks at a time, and they are taken down as you feed out and piled away for another year.

MR. NORTH.—You don't think it is necessary to double board and put in tarred paper?

MR. SMITH.—No, not necessary at all. Just enough to keep it in position. In fact, the whole business of the silo is just as simply and easily understood as building an ice house. You don't want any drainage; you don't want any grout bottom; you will not have any waste to it, than to a body of ice. You want a foundation to set your frame on; throw up the earth inside the walls, set your studding, and you have all

the drainage you want. If the silo bottom is one foot above the surface outside, there is no water goes up hill, and that's all the drainage you need. Just put something in the bottom, so the feed will not be dirty. You want to get heat into it and you want succulent feed. Heat is the fundamental principle of the whole thing. You will heat it up before it is scattered into the corners and trampled down; that will prevent any trouble in the corners.

MR. NORTH.—In feeding off, do you feed out of one side?

MR. SMITH.—Yes. There is a good deal of lateral pressure while it is simply green. If you carry it sixteen feet high, you want at least a two by ten every fifteen inches; if you carry it eighteen feet high, you want a two by twelve, in order to carry the excess of lateral pressure, but after three weeks, the lateral pressure ceases entirely, and there is no danger about your partition. Of course, if you open both pits at once, it is the same as not dividing it at all, and I have my doubts whether it is neccessary to divide it at all.

MR. J. A. SMITH.—I think the superintendent will bear witness that probably I have heard more silo talk than any other one man in the State of Wisconsin, for I have attended all the institutes since they have been begun, but last Friday I heard something new. The question of the division in the silo has come up several times, and from the testimony of gentlemen who have talked about it, I have come to the conclusion that the partition in the silo is all a humbug, that you don't want any at all. We had with us at Hartford at the institute, last Friday, a gentleman who has had considerable experience in silos. He has built a silo one hundred feet long and sixteen feet wide; he has a door in the end, and has a long carrier by which he distributes the feed for the whole length of the silo. He begins filling one day in one end, and so on until he gets clear to the other end, and then he goes back again over the same ground, so that his feed is all in one compartment. By figuring, you will see that that sized silo will hold over six hundred tons, which he uses for the purpose of making beef. When he begins to feed from the silo, he begins at the door end, and cuts down a slice four feet wide, covering just so much as he cuts off, and the air striking the fresh cut place, does no damage before he wants another slice, and after he has cut one or two more slices in that way, he has room enough to operate from, and he then pulls down the raw edge, as you might call it, so that he has an inclined plane to draw from, making it easier and faster work. I believe that the day has come when we don't want any partition at all in the silo.

MR. URQUHART. — I filled one last year without a partition at all, filling one end of the silo one day, and the other end the next, and I found it came out almost as well as where I had it in two compartments. In feeding out, we were told that we would have to take off and feed it from the top. I took off and began feeding from the end. The end was against my barn, and I took off that end and kept it at an inclined plane of about forty-five degrees, and we would just rake it down, and it worked well.

MR. HOXIE.—I am glad to hear this testimony come out, for at a convention at Mazomanie, I made the statement that it was not necessary to have this partition except for temporary purposes, and the whole convention came down upon me.

DOES THE SILO AND ENSILAGE PAY?

By J. H. FOSTER, Winnebago County, Wis.

Twelfth Paper.

The Months for Butter.—In former times the months of June and October have been the months for the production of the best and sweetest butter. This is because the grasses at these times are filled with the choicest and best of the juices and aromas, which are treasured up and given out through the medium of earth, atmosphere and sunlight. In these months the grasses attain their highest perfection in storing up the essential sweets which are so recognizable in butter.

A Food Found for Cows.—From this fact it has long been the desire of the butter-maker to find a food for his cows that possesses the qualities of juices and sweets that are contained in the June and October pasturage. If, he has said, during all these years, I could only find a permanent food ration for my cows that would enable me, at all seasons of the year, to produce butter having the quality of the butter made in those months, and that would keep up the flow of milk of those months, it would pay to keep cows for dairy purposes, and would give a satisfaction to the work as well as being remunerative. Many substitutes have been formulated and tried, but always with inconsiderable success. It was therefore with great joy that the dairyman and the farmer hailed the light of promise that came in the announcement that a receptacle could be made for green forage plants and grasses that would perfectly preserve them for months, and even years, and in such a form as to retain the juices and sweets (during all this time) unimpaired, and that cows fed upon this food would give milk that would produce results as good as when they cropped for themselves the pasturage grasses of June or October; and further, that quantity as well as quality, would be maintained. While this, as I have said, was a welcome announcement, it was received with a great many grains of allowance, and was believed with a great many grave and serious doubts. It seemed to be too good to be true. As the years went by, the evidences of the truth of the assertion continued to accumulate, and there were persons in our own state who had the courage of their belief and convictions. They gave the matter a trial. Wherever there was a trial made, and made as it ought to be made, it was a success, and like a falling body, the idea gained force by its own momentum.

Change in Farming Methods.—As one engaged in farming in a small way, I had long been convinced that unless we could find some way to change our methods of farming, some way to increase production, and that, too, in a way that would cheapen as well as increase it, farming in Wisconsin, with from six to seven months of feeding time, and in competition with the milder climate, and the cheaper lands of the Southern and Western plains, would be-

come unprofitable and ruinous. In this condition of things it was with eagerness and intense interest that I listened to what would, to a novice, seem to be a fabulous statement of Superintendent Morrison's workers, of the value of the silo in preserving, in the ensilage form, our forage crops, and of the wonderful feeding value of ensilage to all kinds of stock, especially to milch cows.

Building a Silo.—Becoming acquainted with John Gould, the ensilage enthusiast of Ohio, I listened to his talks on ensilage, both in public and private, until his extreme idea seemed to be true. Convinced that something must be done, and saying to myself, "I do believe," with quite a little of the "Help Thou mine unbelief," I went to work last summer and built me a silo. The silo was built inside of the barn; was one of the bays of the barn, the barn being 32 feet in width. The bay was naturally fourteen feet wide, with a basement eight feet below the floor. The entire depth of the silo when finished was twenty feet, making it inside about twelve feet, four inches by twenty-eight feet, four inches, and twenty feet in depth.

Corn—Drouth—Feeding—I had, in preparation for it, planted eight acres of ensilage corn. Despite the most terrible drouth ever known in our section of the state, this corn grew, to a fair maturity, a green crop of fifteen tons to the acre. From this crop I fed my cows and work horses until the time for filling the silo. What was left, (about 100 tons), I cut into my silo. I have been feeding from this during the winter, and am now prepared to give my testimony as to its value as a food for stock, and to its preservation in a green, sweet condition in the silo. There was but little loss from mold or decay. The most of it came out bright and good, and nice, palatable and nutritious food. To me it is a demonstrated fact that the ensilage fodder is the stock fodder of the coming years, and the silo is the place in which it will be stored and preserved. That it is the most economical food that we as farmers can use, is demonstrated by the most simple calculation.

Yield of Ensilage Corn.—A fair average yield of ensilage corn would be, at the least estimate, 15 tons, or 30,000 lbs. per acre. Fifty pounds per day for a season of 200 days would be 10,000 lbs. or five tons. At this rate one acre would produce enough to feed three cows the entire season of 200 days. Or, if you could get your cow to eat 60 lbs. per day she would consume 12,000 lbs., or six tons in the 200 days, or at the rate of two and one-half cows for the 200 days upon the product of one acre. The same cow, if fed upon well-cured, good hay, would consume at the least calculation two and one-half tons, being twenty-five pounds per day. To keep one cow on hay would require the product of one and one-fourth acres; or stated in another form, it would require the product of one acre to keep four-fifths of one cow for the season of 200 days. This estimate is based upon the product of two tons of well cured hay per acre. So you see that an acre of fodder corn of fifteen tons, green weight, would, if well preserved in the silo, keep one cow 600 days, giving her 50 pounds a day, and that one acre of hay that would produce two tons of well cured hay would feed one cow 160 days, the feeding value being three and three-fourths times greater in the acre of ensilage than in the acre of hay. If the ensilage were fed at the rate of 60 lbs. per day, the 15 tons would feed one cow 500 days, giving the feeding value of the acre of ensilage three and one-eighth times greater than the acre of

hay. These estimates are not strained or extravagant in the least degree, but are fair—fairer indeed to the acre of hay than to the acre of corn, for the acre of ensilage corn oftener weighs 15 tons than the acre of hay does two tons.

Does the Silo and Ensilage Pay?—These being the facts, it would seem unnecessary to ask: Does the silo and ensilage corn pay? Of course there is a greater amount of labor required to produce and preserve the acre of ensilage corn, but the extra expense is in no way comparable with the extra production. Had I the time, it would be both interesting and profitable, to pursue the comparative estimate in the direction mentioned; but enough is known to clearly assert that, comparatively speaking, the increased production is *large*, while the increased cost is *small*. The silo has come to stay, and the staying and successful farmer will avail himself of this valuable adjunct to his farm properties, just as fast as his means will permit.

Building and Filling.—Of the building and the filling of the silo, I will not stop to speak, as that has been so ably and so fully done by others who have spoken on the subject. But I will say this—in building a silo, build it well. Lumber and tarred paper properly used, and used wherever needed, will make an air-tight silo, and this is the one thing of prime importance. It is the great prerequisite in the preservation of the ensilage. I built mine well, sparing neither time nor expense, in all that pertains to making it air-tight and strong. The result has proved the wisdom of this course, in the successful preservation of a juicy, nutritious and palatable feed. In filling do it with judgment and care. Don't cut any wet or moldy corn into your silo, and then expect it to come out bright and sweet. If you do, you will find, when you come to take it out, that your sin, or carelessness, has found you out. You can't expect any more to "gather grapes from thorns, or figs from thistles," from the preserved fruits of the silo, than could the people of ancient time from the plains of Galilee, or the hillsides around Jerusalem.

The Silo and Ensilage Pays.—Yes, the silo and ensilaged feed, does pay. It pays in many ways. In the furnishing a food for the cow that is largely similar to the pasturage grasses of June and October—one that will give almost or quite as good results in the milk and butter product as they. It prepares the farmer to laugh at the drouth, and to feed his cows as well when the pastures are all dried up, as when they are at full production, and keep the flow of milk at its full. It enables him to make a uniform quality of butter the year round, giving a constant summer in the dairy from the year's beginning, to its end. It enables him to keep twice or three times the amount of stock that he formerly could, and he can keep his steers growing almost or quite as fast during the winter months as in the summer, the better preparing him to compete with the ranchman of the Western plains. Yes, Mr. Chairman, as the question now stands, "Does it pay to build the silo and feed ensilage?"—I answer aye.

TELLING FACTS IN FAVOR OF ENSILAGE.

Claims of Ensilage.—Recently the Kansas Board of Agriculture appointed a committee to investigate the claims of ensilage. The committee was made up of men well known throughout the world of agricultural progress—Prof. Shelton, A. C.Pierce, Wm. Simms, Thos. W. Potter and O. E. Morse. Their report concludes as follows (SUPT. MORRISON):

1. That the time has arrived when the more progressive and economic methods of conducting the dairy and beef producing interests should command the thoughtful consideration of Western farmers. 2. That the method of preserving green crops by means of silos, now common in the older states, is generally commended as *practical* and *profitable* by those having the largest experience in the business. 3. That ensilage, if intelligently prepared, is a good, wholesome article of food for cattle, and when fed as it should be, in connection with dry feed, will materially increase the product and profit of the dairy; make the production of beef more remunerative; improve the condition of hogs, and enable the farmer and stock-grower to realize profits not promised by the methods now common in the West.

4. That corn is the most profitable crop for ensilage, and for this purpose, the seed should be drilled at from eight to ten inches, in rows three and one-half feet apart. Good cultivation is required, and the crop should be cut just before or about the time the ears *begin* to glaze. 5. That corn planted, cultivated, and cut as above indicated, will average not less than twenty tons of ensilage per acre; that in feeding value, three tons of corn ensilage will equal one ton of tame hay, or that one acre of corn, when made into ensilage, will equal about seven tons of hay; that the feeding capacity of a given amount of land can be at least doubled by the method proposed, and without adding materially, if at all, to the cost per head of animals fed.

Feeding Cattle on Ensilage.—The following account of an experiment with ensilage is taken from an English Journal (HON. C. V. GUY):

"At Leicester the other day, a company of agriculturists partook of luncheon from beef of a twenty-two-months'-old-steer which from birth had been fed on nothing besides milk, ensilage and linseed cake, and whose carcass weight when slaughtered was 660 lbs., which at 14 cents per lb would give a value of $95.78. The quantity of ensilage consumed was 28 lbs. per day from the age of three to six months; 35 lbs. per day from six to eight months; 45 lbs. per day from eight to ten months; 50 lbs. per day from ten to twelve months; and 55 lbs. per day from twelve to twenty-twonths—making 27,196 lbs. altogether, which was the produce of 1½ acre of clover, mown twice. In addition to this, the animal consumed 939 lbs. of linseed cake, 45 gallons of new milk consumed in the first month, and 124 gallons of skim milk in the second month. This was valued at $9.22, the ensilage at $14.43; linseed cake, after deducting one-fourth for manurial value, at $12.20, and after adding $23.50 for labor and attendance, cost of litter and cost of calf when experiment commenced, there was still a balance of nearly $37 in the animal's favor. The beast did well on the ensilage, and was thoroughly healthy throughout, and the beef was considered to be of excellent quality, so that the experiment, which was conducted by the Ensilage Press Company, may be considered as having established two very important conclusions—first, that cattle may be fattened entirely on ensilage and linseed cake, no addition of hay or dry fodder being requisite; and, secondly, that when fattened, a very satisfactory return may be realized, quite equal to that usually derived in feeding on roots and hay."

Ensilage Butter.—Some believe that the milk from cows fed on ensilage will not make fine butter. In answer, I ap-

pend the following correspondence (SUPT. MORRISON):

Wm. E Clough, Chicago. Dear Sir—I send you to-day by express three tubs of butter. Perhaps you are not aware that the butter I had sent you since the middle of last November (4,000 pounds) was made from the milk of cows that were fed daily from 45 to 50 pounds of corn ensilage, with wheat bran and hay.

As the ensilage is now all fed out, I write to ask how this butter will compare in quality with that I have sent previous winters.

I wish you to give your opinion frankly, so that I may determine whether I had better fill my silo again or not.

Whitewater, Wis., May 1. C. R. BEACH.

C. R. Beach. Dear Sir—Answering yours of May 1st, I would say that your butter during the past winter has given eminent satisfaction to our best trade. It has sold promptly, and been inquired for often by parties desiring fine butter, who often wait from day to day to get the goods rather than take any other. The desire to obtain it has been more marked this winter than ever before. We hand you herewith returns, shipments received today. Buyers were waiting for the goods when they arrived. Thanking you for continued favors,

Chicago, May 2. WM. CLOUGH.

I shall plan to fill my silo again.

CHAS. R. BEACH.

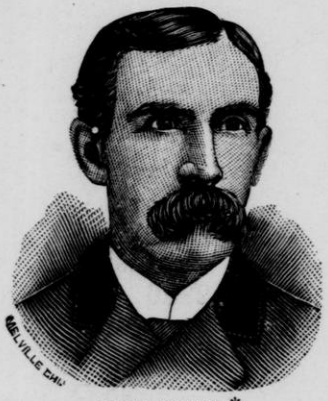
THE BUILDING OF SILOS.

By JOHN GOULD, Western Reserve, Ohio.

Disadvantages of Stone.—The apparent abandonment of stone, or concrete, for the building of silos, and the almost universal adoption of wood in its place, has brought out a considerable inventive skill on the part of the builders. The reasons for discarding stone arise from two principal causes. Stone is not always abundant when needed, and the attending cost is often more than the farmer cares to assume. Stone, too, is a poor material with which to build to secure the now desirable *ripened* or sweet ensilage. Being a remarkable conductor of both heat and cold, it first absorbs the developing heat of the ensilage, and prevents the material along the walls from approaching 125°, now demanded. In cold weather, the reverse becomes true, and the warm ensilage on the one side of the wall condenses the entering frost on the inner surface, and there is a loss of more or less ensilage by mold, decay and kindred wastes. This is not so pronounced with the silo built of lumber, boards and paper. The wood being a good non-conductor of heat and cold, these influences play an unimportant part. The ensilage heats up readily against the walls. The frost has but little influence, and the waste is trivial, the greater part being in the corners, a matter which can be remedied by filling in the angles each day with hot ensilage from the center of the pits.

The Wooden Silo.—How shall the wooden silo be built? There are several variations of the same plan, for the silo must be a box of varying dimensions, usually twice as long as wide, and as deep as wide, though now the silo is often found twenty-five feet in depth, and with apparently corresponding good results, as the deeper it is, the greater its own settling weight. The silo in the

barn, and the one built as an addition or annex to the barn, differ only in this: The latter must be provided with a roof, and, for appearance sake, should have a siding of some description. The silo inside the barn wants neither, as the sides of the barn make its outer cover, and the one roof covers silo and barn alike.



JOHN GOULD.*

A Strong Building Needed.—The wooden silo needs to be a strong building, and well secured at the sills, to prevent spreading, and at the top to guard against springing out of the building. This is not so much to be guarded against in the barn-silo, as the frame of the building increases the strength of the silo walls.

Building in the Barn.—In building a silo in the barn, it is not economy to try to make the barn answer in part for the other. The silo should be built independent of the barn, i. e., it should have its own frame work, although the studding can be much lighter than the out-door silo. Nor should any attempt be made to join wood and stone in silo building. If there is a stone wall under the barn, let the scantling for the silo go down *inside it to the ground*, and so leave an air space between the stone wall and the silo lining. The same objections are met with in this case as in the stone silo, and it is hard to join wood and stone so there will be no giving way of the joint, and air will enter. The whole secret of silo building is to make air-tight walls. The floor or cover are not nearly as essential to the securing of No. 1 ensilage.

Plans and Diagrams.—As it is very difficult to give any plans to guide one in building silos inside of barns, the accompanying diagrams are for silo annexes to barns; but this much is common to all. The inside lining and fixtures of one are just as applicable to the other. It is proper to say that the illustrations accompanying this text, were drawn by Mr. A. P. Gould, of Canton, Ohio, expressly for this article.

Fig. I, p. 82.—Shows a good way to make a secure foundation. The soil is all excavated from the floor to the depth of about one foot over an area covering the outside measurement of the walls. A trench is then sunk, just inside this excavation, and built up a little above the outside surface of the soil, as seen at A. A sill, 8x8, is bedded into the inside foot of the wall at B. The studding C, for the frames, is cut with a shoulder,

*John Gould is a native of the "Western Reserve" of Ohio, born of poor parents, and about 44 years of age. Always living on a farm and getting his education at the country district school, Mr. Gould has picked up quite a stock of general information, and has had, besides, the experience of twice going in debt for a farm, and paying the whole amount from its earned proceeds, which is his practical experience of farming. While never losing his grip on the farm, Mr. Gould has had considerable journalistic experience, having been, at one time, a staff writer of the Cleveland, O., *Herald*, and later on, for years, its agricultural Editor. Since 1879, Mr. Gould has been a regular on the *Ohio Farmer* force, and for the past four years has furnished considerable "requested" matter for the leading agricultural papers, East and West. In 1883, when the Farmers' Institute course was adopted in Ohio, Mr. Gould became one of the corps of assistants, and since then, the larger part of his time in the winter has been devoted to institute work. In 1886 he was selected as a corps writer for the entire winter list of institutes in Wisconsin, and the following winter was elected to the position of Assistant Superintendent of institutes.

and set on the sill, the spur going down inside to the earth floor, D. The studding for the building should be 2x10 inches, and set 16 or 18 inches apart on the sill. The inside lining of the silo comes down close to the natural soil of the floor, F. By this plan, the trench affords needed drainage, and the slight excavation gives the wall the *back sup-*

prevent the building from spreading, cross sills, N, 2x8 inches, are framed into the sill, P, at the lower side, crossing to the opposite sill. The studding, B, is mortised into the sill, and the silo is lined up inside with two thicknesses of inch boards, 8 or 12 inches in width, as shown, breaking joints with a half lap, the tarred paper, S, being between them,

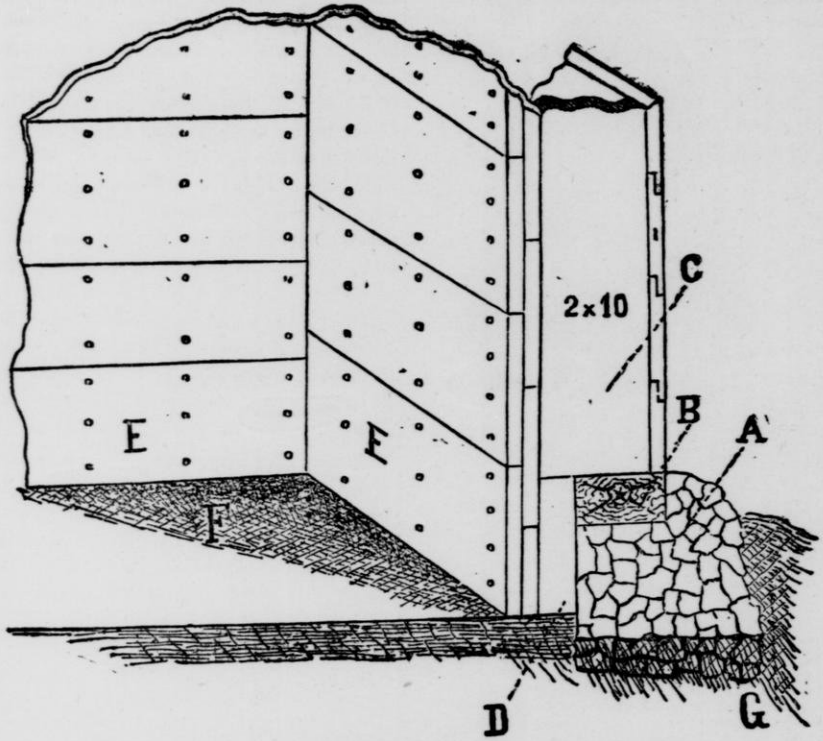


FIG 1. FOUNDATION OF SILO (*For Description See Page* 81).

port of the natural earth, G., and is not only thus made secure, but gives "dry footing" to a building that of necessity must be built with sills close to the ground.

Fig. 2, p. 83.—Shows the same general outline, except that the stone work is dispensed with, the sill P being bedded in the mass of cement depicted. To the three strongly nailed to the studding, B.

Fig. 3, p. 84.—Gives the general form of construction of the silo, with the corner "cut away" so as to show the framing. P is the sill; B B B the studding; A the corner post, showing the crossed corner; T the door; E E the inside lining, the same as Fig. 1; H

is the siding lumber of any sort; R is the inside plank partition, fitting into the grooves, S S S. This partition is made of two-inch plank with jointed edges, not matched. As the filling of the silo progresses, the planks are added as required, until the top is reached. When feeding out the ensilage, the pit is better than jointed plank. To prevent the planks from springing by each other, two or three pins can be put in each one, fitting into corresponding holes in the plank above. The rest of the cut is self-explanatory, and aside from the siding wall, represents a silo in a barn interior.

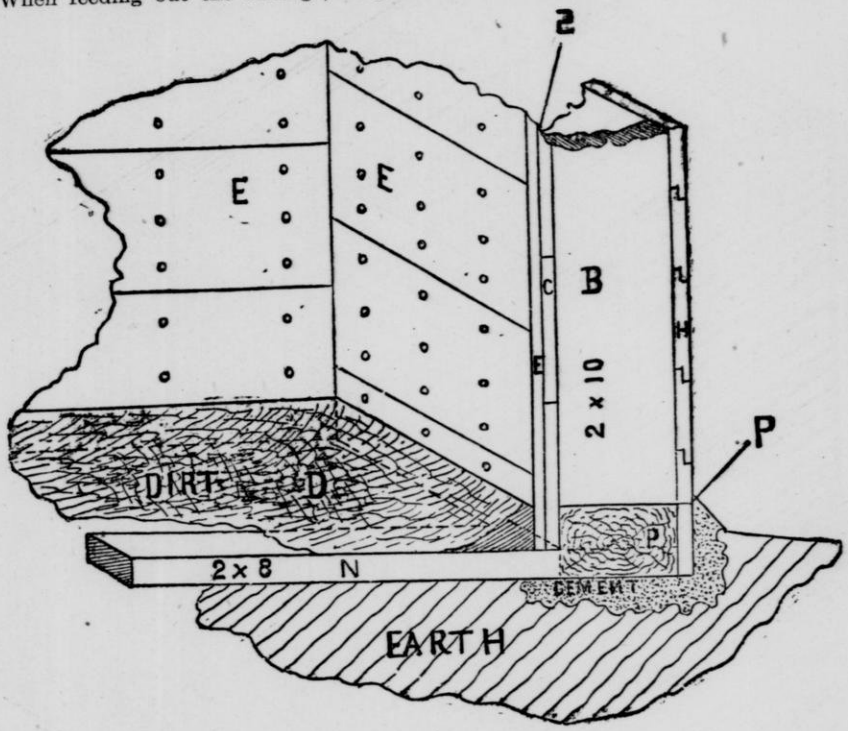


FIG 2. FOUNDATION SHOWING SILLS BEDDED IN CEMENT (*See Page* 82).

K is first fed. Then the cover is removed from the next pit, and as the feeding progresses, the planks are removed one by one. They should be numbered so as to be replaced in order when refilling the silo. If a solid partition is thought best, 2x4 scantling will be set up across the silo in placing the planks, and ceiled up, both shown in Fig. 7, but it does not appear wherein it

Fig. 4, p. 85.—Shows an enlarged view of the corner in fig. 3, and will be readily comprehended by any carpenter. The inside lining boards, D C, are cut in at the ends, and crossed; the 4x4 scantling, A, being set in the angle. The studs, B B, are set in the two outer angles. The boards are first nailed to A. When the first lining boards, J J, are all in place, the studs, B B, are put up, and

nailed to *from the inside*. The second lining boards, E E, are simply cut with a square end, and nailed tight to B B. This gives a corner of great strength, that it is impossible to pull apart or burst through. F G are false studding walls from springing out at the top. By the plan it is seen that no plate is used, and the rafters, K K, 2x8 inch, are spiked to the top of the studding, B. The under cross ties, L L, are 1x8, and at the heel, are nailed strongly to the

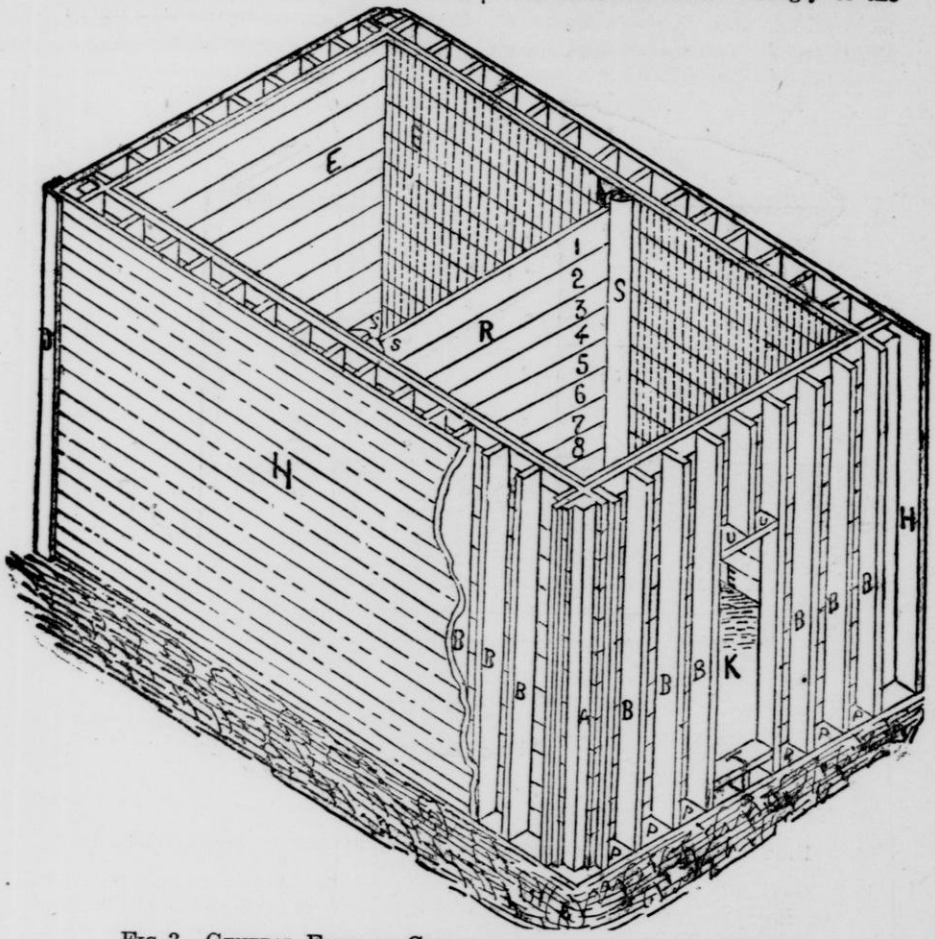


FIG. 3. GENERAL FORM OF CONSTRUCTION OF SILO. (*See Page* 82.)

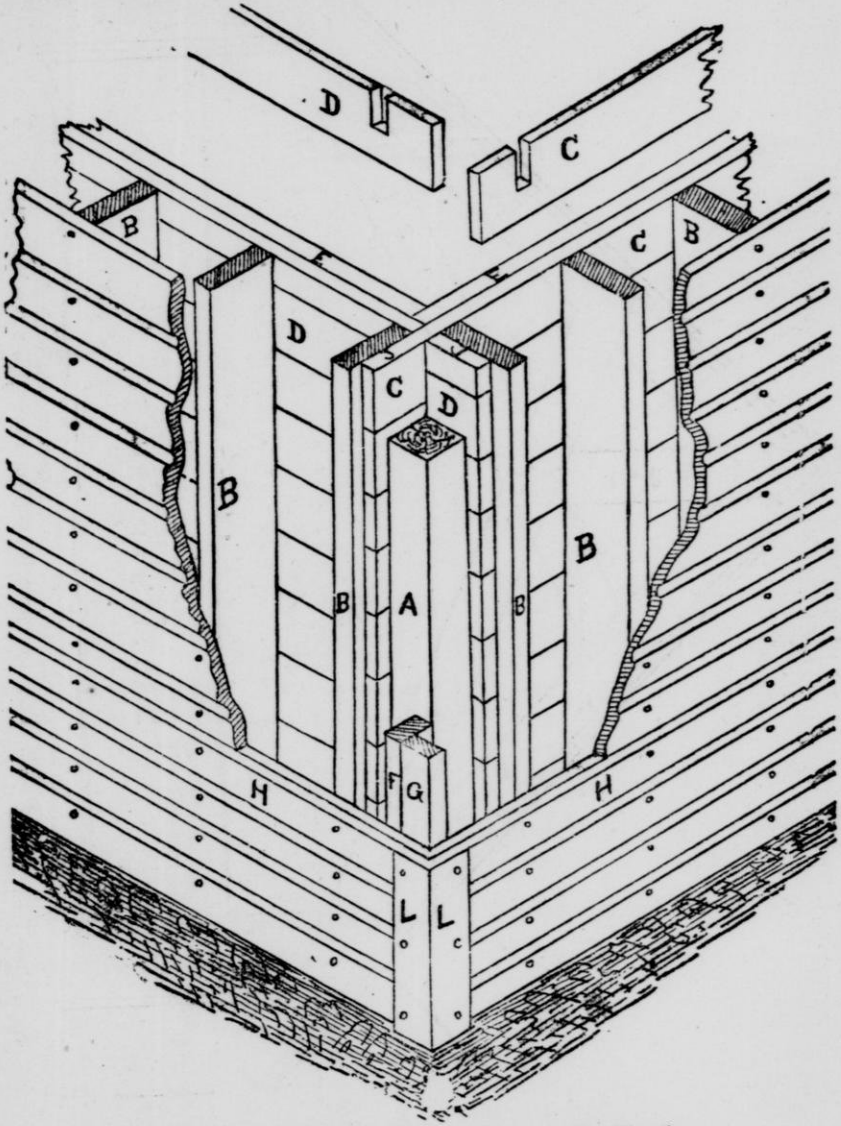
to build out the corner to nail H H to, so as to give the corners a finished appearance.

Fig. 5, p. 86.—Shows the plan of truss roof, to not only strengthen the building, but also keep the opposite side of the stud from K. The three can then be clinched by using wire 20d. nails

Fig. 6, p. 87.—Is an enlarged plan of fig. 5 at K, and is, with fig. 5½, p. 87. clearly depicted.

Fig. 7, p. 88.—Shows the two forms of partitions, plank, double, B, and ceiled on scantling A. The planks are held in place by cleats fastened to the walls, and the other partition is tied into the walls at A, and secured by the scantling C.

Fig. 8, p. 89.—Shows the silo complete. The Dormer window is placed over the center of the partition, so that when



IG. 4. ENLARGED VIEW OF CORNER (*See Fig. 3*).

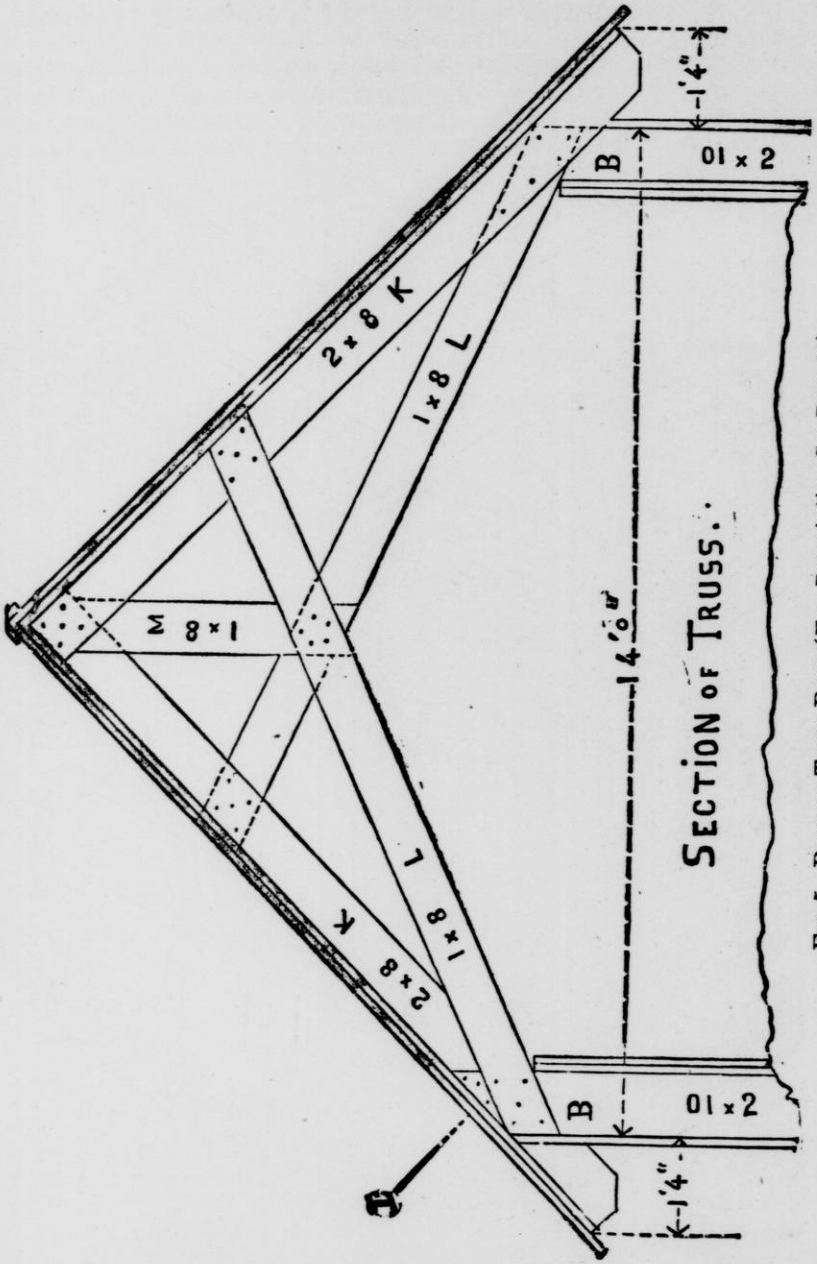


FIG. 5. PLAN OF TRUSS ROOF (*For Description See Page 84*).

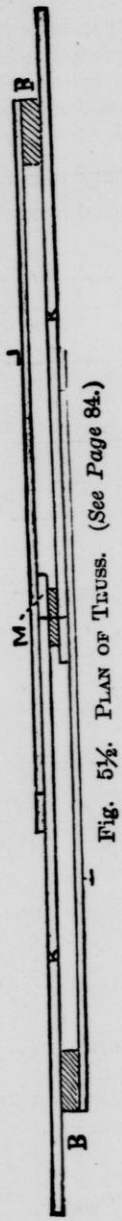


Fig. 5½. PLAN OF TRUSS. (*See Page 84.*)

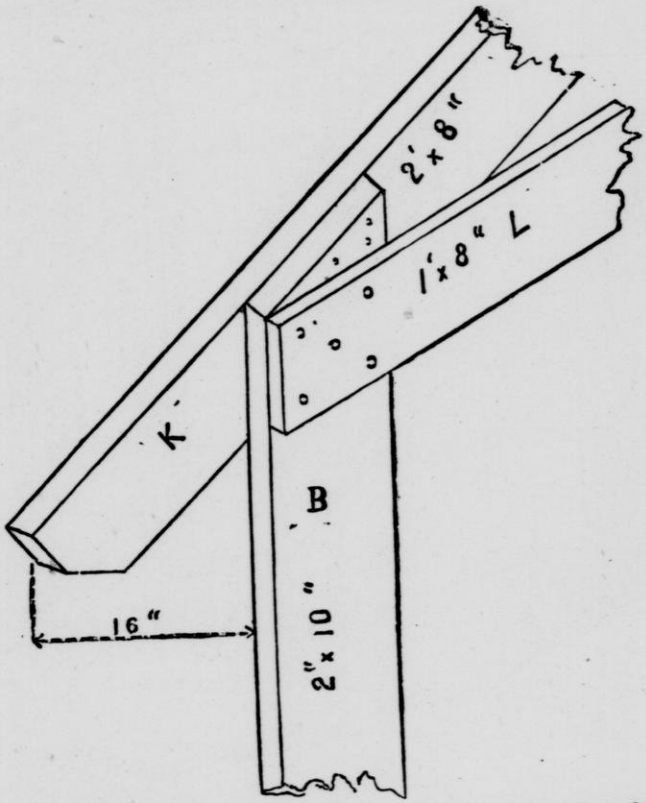


FIG. 6. SHOWING HOW RAFTERS ARE SPIKED (*See Page 84*)

the carrier of the cutter is run in through this window, the ensilage can be distributed at will in either pit. If preferred an aperature can be cut in under the eaves, and one need not be at the expense of the roof window.

If only one thickness of lumber is used the paper will add no value, as it will spring away from the boards between the studding and allow the free admission of air between paper and board. Taking cost of No. 1 flooring, and two

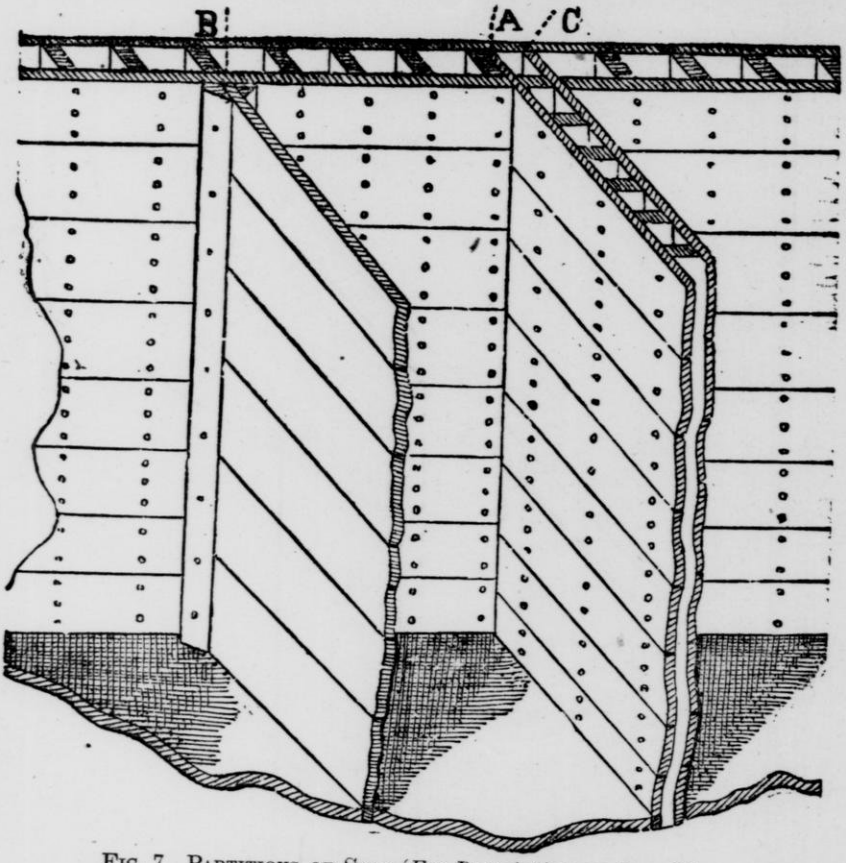


FIG. 7. PARTITIONS OF SILO (*For Description see Page* 85).

Inside Facing.—A few words about the inside facing of the silo. While there is no absolute rule about silo building, the air-tight wall cannot be lost sight of, and some contend that, for the inside face, paper first put upon the studding, and then covered with one thickness of matched flooring, is all that is required. thicknesses of common inch boards, the difference is but little, and then if the paper is put between the two, a solid air-proof wall is secured. Matched lumber is liable to have the grooving broken by swelling, and a defect is at once made in the walls, which cannot happen with the other method, as shown

in Figs. 1 and 2. The last, a finishing lining, E, in Fig. 2, had best be surfaced on one side to prevent, as much as possible, dragging in the settling ensilage.

Painting—Floor.—The wooden silo needs a cheap, water-proof paint to secure it from decay. So far, coal tar, made and applied boiling hot, and reinforced with some rosin, to give solidity to the tar after application, is probably as cheap and durable as any substance, although pitch, and other roofing paints that harden well, are each and all good. The floor may be thinly covered with

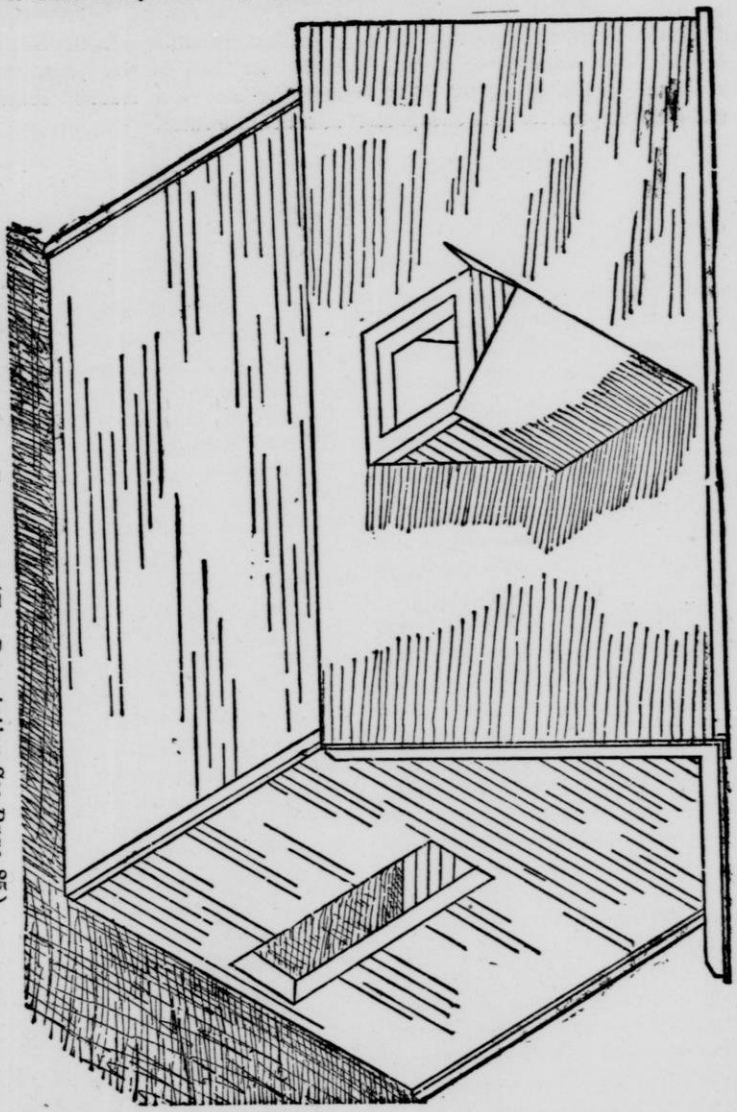


FIG 2. WOODEN SILO COMPLETE (*For Description See Page 85.*)

cement plaster, but it has very little superiority over clay well pounded down, and allowed to come up a few inches on the inside of the silo walls, as seen at D in Fig 1.

Cost.—The cost of a silo is impossible to tell without all the incidentals and conditions of building, but it may be safely said that it varies from about 50 cents per ton for the cheapest, to $1.50 for the most expensive. Its cheapness, however, is apparent for the outlay for storage for 2½ tons of ensilage is reckoned as against the storage for hay. The former occupies less than 125 cubic feet, and the ton of hay over 500. So silos cost far less than hay barns. What silo building may develop into in the future no one can tell, but it would appear that the changes in the future will be far less than in the past, and silo building has now reached somewhere near definite rules.

CATTLE SESSION—MARCH 29.

THE CATTLE INDUSTRY.

By J. McLAIN SMITH, Dayton, Ohio.

First Paper.

W. D. HOARD in the Chair:

Fertility.—In these days of low prices and sharp competition it is only the large crop that pays. But in order to grow big crops, and at the same time preserve or increase the fertility of our lands, we must have an abundant supply of manure. No farmer, it seems to me, should be satisfied with his life, and no farmer can be considered successful in the highest sense, unless he leaves his land in better condition, and more productive than he found it. This can only be done by the direct application of fertilizers. There is no recuperative capacity in the soil itself, except its gradual disintegration, and the slight annual addition of nitrogen—not half enough to balance the annual removal in the crop, and the plowing under of clover and other green crops, while it improves the texture, and renders the plant food more available, does not add to the stock. It helps the pump but not the supply of water. No plant *creates* fertility. It only concentrates it, and renders it available. If we would make our farming successful in the highest sense, we *must* restore directly to the soil a considerable portion of the nitrogen, phosphoric acid, and potash removed in the crop.

Keep Some Neat Stock.—Except in the case of gardeners, whose large returns justify liberal expenditures for fertilizers, this absolutely requires, in my judgment, for all this region, a considerable number of neat stock, at least one cow or steer to every five acres of land under cultivation. I say it necessitates *neat* stock, because nothing else will supply their place in the hands of the general farmer. Hogs do not consume the rough feed on a farm; and brood mares cannot, generally, be kept at a profit in sufficient numbers. Except in the case of gardeners, therefore, I think I am justified in saying that no man can be permanently successful in farming who does not keep at least one head of neat stock to every five acres of land under cultivation. In many cases, doubtless, it would be profitable to keep two or three times this number. But one to five acres, I believe, is essential to make grain growing permanently successful. In this state you have, in round numbers, a million and a half of neat stock to eight million acres of improved land—or very nearly the proportion I have given. But a large part of these are concentrated on farms specially devoted to stock growing or dairy hus-

bandry. The ordinary grain farm does not carry, I apprehend, on an average, half this proportion, and it is to the ordinary grain farmer, or the farmer engaged in mixed husbandry, that I wish to address myself.

Plant Growing.—Plant growing, including grain and textile material, must ever be the principal business of agriculture. The world must be fed and clothed, and the feeding and clothing will ever be largely of vegetable products. These products, in this country at least, can be and should be grown on half the present area. But in order to do this and make the industry in the highest degree successful, grain growing and stock growing should go hand-in-hand, *and on the same farm.* Manure is too bulky to transport to any great distance. The stock should be kept, as a rule, *where the manure is wanted.* What we need, I think, is fewer great cattle ranches and a larger stock of cows distributed over our grain farms. The most successful farming of the future will be, I think, in this line—grain growing and stock growing combined; and the cattle industry will be, and should be, as widely distributed as agriculture itself.

What Breed of Cows—Will be employed, will depend on circumstances—soil, climate and special local and individual adaptation. In the vicinity of large cities milk, perhaps, will be the profitable product. In others, specially adapted to the purpose, butter and cheese. In others, beef. If milk is to be the leading purpose, a breed should be selected that will give the largest return of milk in proportion to food consumed. If butter and cheese is our principal resource, then select a butter and cheese breed. If grain growing is our object, and the cow is kept as an incident or auxiliary to this, or if the production of beef is to be the main thing, then select a breed that will make beef of high quality and at the least cost. But this, I think, is certain—that in all the region east of the Mississippi a cow must do something more than raise a calf. Mr. Dunham or Mr. Ellwood cannot breed a colt, in their establishments, as cheaply as you or I can breed it, from a mare that pays for her keep in honest work. At present, and perhaps at all times, they can get enough more for their colts to cover the difference in cost. But beef cattle do not sell on the reputation of their breeder; and a cow cannot be kept profitably on lands worth forty to sixty dollars an acre, merely to raise a calf. Just as good a calf can be grown, with additional work, from a cow that will pay for her keep, and all the additional labor, in dairy produce. The great stock farms, in all the region where grain growing is possible, are destined to break up. They must give way to a more progressive, and a more scientific agriculture. They cannot compete with the general farmer, where the milk and the manure of his cows pay all his expenses. These great stock farms, where all the land is used to grow cow feed, and the cow is kept a year to grow a calf, worth, at weaning, perhaps fifteen or twenty dollars, *must go*; the sooner they go the better; and the cows that cannot produce more than milk enough to raise a calf may as well go along with them. Beef growing cannot be very profitable in this State with such cattle.

A Good Beef Animal.—Just as good a calf can be grown on skim milk, with some addition to replace the cream; and just as good beef can be made from a breed of cows that will raise a calf and pay for their keep beside. The idea that a good beef animal is, of necessity, a poor milker, is an absurdity. You might

as well contend that a sheep cannot grow both wool and mutton. There is nothing more inconsistent in one set of attributes than in the other. The fact that our best beef breeds are generally poor milkers proves nothing. Any breed would be poor milkers, handled as they have been. The large and continuous milking of a good dairy cow is an artificial, and in one sense an unnatural condition. They require constant care and selection to keep the breed to the highest notch. Neglect them for a few generations, and they revert to what may be called their natural state—simply giving milk enough to support their offspring. Our beef breeds generally are poor milkers, because heretofore the breeders of beef cattle have not desired good milkers, and have made no effort to secure them. On the great ranges *now* such an animal is decidedly preferable, and a good milker is a nuisance.

Milking Qualities.—That good milking qualities are not inconsistent with the capacity to lay on flesh, is abundently shown in the history of the Shorthorn. When first introduced into this country, the cows of that breed were generally good milkers, many of them having records of twelve to fifteen pounds of butter a week, and some reported as high as twenty pounds, on grass alone, and they were in no wise inferior as beef cattle. In England, to-day, where milk is of more consequence than it has been thought in many parts of this country, the Shorthorn is the leading dairy breed. Many of the strains are not eligible to record, and possibly not strictly pure, but certainly Shorthorns in blood and in appearance, are as fine dairy stock as the world contains. A Shorthorn, three times at least, and I believe four times, in the last five years, has carried off the prize as the best milker at the great London Dairy Show—a prize which is awarded from actual test on the ground, and where all the great dairy breeds are competitors. It is not likely that one of these cows would be successful at the same time in a fat stock show. But there is no reason in the world why her steer calf should not be.

Public Tests.—We have had too few public tests as yet in this country to make any just comparison between the breeds. In England, however, they adopted that system of awarding prizes much sooner, and the results are significant. Taking an average of all the animals tested at the British Dairy Farmers' Association meetings, during the last eight years, we find that 73 Shorthorns gave an average of 42.80 lbs. of milk in twenty-four hours, which contained 12.80 per cent. of solids, and 3.69 per cent. of fat. Fifty-six Jerseys tested gave an average of 28.11 lbs. of milk, which contained 13.87 per cent. of solids and 4.31 per cent. of fat. In other words, taking no account of feed, the Shorthorns are decidedly the better dairy cows, whether for milk or for butter. The Jerseys gave the richer milk, containing 1.06 per cent. more solids and .62 per cent. more fat; but they gave on an average, 14.69 lbs. *less* of milk per day, or just about *two-thirds* as much as the Shorthorns.

Private Tests.—These yields are all small as compared with the private tests we see quite frequently published in the agricultural papers. But I, for one, place no reliance on a private test if it is at all remarkable. Some doubtless are true, but many, I am sure, are false, and I have no way of distinguishing the two. In race horses, a public performance, with a disinterested party to hold the watch, and two or three other disinterested parties to watch *him*, is the only evidence the public accepts. And it is the only evidence we should

accept in regard to a cow, unless the claim put forth in so very modest we may feel sure, if the party were lying, he would make it better.

Milk Yields.—Holstein breeders talk glibly of 80 and 90 lbs. of milk a day from many of their cows, and some even claim yields exceeding 100 lbs. in 24 hours. But they never enter their cows in a public test. No cow, so far as I have noticed, has ever given 70 lbs. of milk in 24 hours in any public test; and no cow has ever made two pounds of butter in 24 hours under similar circumstances, except at the New York Dairy Show. At the last London Dairy Show thirteen Jersey cows were entered in the milk test, which lasted two days. Excluding two heifers, which the judges thought not in fit condition, the milk yield ranged from 39 lbs. to 80½ lbs. for the *two days*. The butter yield (also excluding two heifers) ranged from 2 lbs., 2½ ozs., to 3 lbs., 15½ ozs.—an average of 1lb., 7½ ozs. daily.

Devons vs. Jerseys.—At the Ontario Provincial Exhibition last fall, the great Jersey breeder, V. E. Fuller, entered four Jersey cows, but was beaten by a general-purpose cow—a Devon. The Devon—Rose of Coburg—made a score of 112.06 points, against 97.89 points for the best Jersey. At the test in this state two years ago, under the supervision of Prof. Armsby, a grade Devon made the highest score both for cheese and for butter. The scale adopted was substantially the same as that in Canada, and Rosa—½ Devon, ¼ Shorthorn and ¼ unknown blood—made a score for butter of 93.47 points against 76.20 for the best of her competitors—a Jersey.

The General-Purpose Cow.—I refer to these public tests not for the purpose of depreciating the dairy breeds—they have their place. But that place is *not* in the hands of the general farmer; and when Jersey breeders, in lauding their favorites, sneer at the general-purpose cow as an absurdity, or physical impossibility, they are not sustained by the facts. In England a general-purpose cow—the Shorthorn has beaten all competitors in the milk tests. In Canada a pure bred Devon made the highest score of any cow tested; and in this state a grade Devon cleaned the platter with equal ease.

Merits of the Devons.—The Devons, it seems to me, are not appreciated as their merit deserves. For thin, or rough land they have probably no superiors. They are rather slow in attaining maturity, and do not attain so great weight as some others, so that thay have never cut much of a figure at our fat stock shows. But in England, where the taste is cultivated to the highest degree, their meat ranks next to the West Highlander in quality; and in their own district they are also esteemed for the dairy.

Devons as Milkers.—Many Devon cows, it is true, are indifferent milkers but many, on the other hand, rank at the very top in this respect; and it would not be at all difficult to collect a herd which would compare favorably with any in *profit* at the dairy. They do not milk so largely as some others; neither do they eat so much. Indeed, the Devon is, or could easily be made, almost the ideal general-purpose cow, for many locations, if it were not for her formidable horns. They have otherwise almost every desirable quality. They are handsome; they are hardy; they are easily kept in good flesh, and make beef of high quality, and they are, or could easily be made, very good milkers in proportion to food consumed.

The Red Polled Cow.—The latest candidate for public favor in this line, and to those who desire a hornless breed, the only one, is the Red Polled cow, or

Polled Norfolk and Suffolk. Originally this was a strictly dairy breed; but of late they have been bred to combine good beef qualities also. Youatt, speaking of the Suffolks as they existed some half century ago, says: "In the height of the season some of these cows will give as much as eight gallons of milk in a day; and six gallons is not an unusual quantity." The gallon referred to is, of course, the imperial gallon, which holds ten pounds of distilled water; so that their yields would be equivalent to about 80 lbs. a day as an occasional yield and 60 lbs. as not unusual. The eighth edition of the Enclycopædia Brittanica, the highest authority on any subject, speaking of the old Suffolk breed, says: "The country of Suffolk has for centuries been celebrated for its dairy produce, which is chiefly obtained from a polled breed of cattle, the prevailing color of which is dun, or pale red, from which they are known as Suffolk Duns."

The Red Polls as Milkers.—The modern Red Polled cow does not, I think, milk so freely as the old Suffolk; but her milk is of better quality. Sixty pounds a day, which Youatt says in his time was not unusual, is now, I think, somewhat rare. Four to five gallons a day, or say 40 to 45 lbs. is, in my experience, a good yield for a mature cow in the flush of the season. But she will easily give, with proper care, seven to eight thousand pounds in a year. I have in my own herd a young cow which gave in her first milking season of less than ten months, six thousand five hundred and sixty-three pounds of milk, and another which gave over five thousand eight hundred pounds, and both came forth with second calf before they were three years old. The first officially tested at the W. Va. State Fair, was giving, seven months after calving, and six months in calf, a fraction over 20 lbs. of milk a day which showed 14½ per cent. of cream. A four year old cow tested this winter for butter, without any preparation, or any extra feed, gave at the rate of ten pounds six ounces of butter a week.

Milk Tests of Red Polls—At the last Iowa State Fair, Gen. Ross, of Iowa City, entered a Red Polled cow in the milk test. According to the official report she gave, in the two days of the test, 77¾ lbs. of milk, which made 2.72 lbs. of butter. The celebrated Holstein cow, Tritomia, entered in the same test, gave 134 lbs. of milk, which made 2.97 lbs. of butter—just a quarter of a pound more than the Red Polled cow. At the last show of the Norfolk Agricultural Society, in England, in the class for Red Polls in milk, the test being the best dairy qualifications, the first prize was awarded Mr. Garrett Taylor's cow, "The Gem," giving five gallons, one pint of milk a day—say 52 lbs.—three months after calving. Mr. Gooderbani's "Strawberry" was highly commended, with a reported yield of six gallons, three pints of milk—say 66 lbs.—and 15½ lbs. of butter a week.

During a visit to the farm of Wm. Steele, in Waukesha County, in this State, he tested for me one of his Red Polled cows, recently fresh. She gave 42 lbs. of milk. I had no means of testing the quality, but it appeared to be very rich. Her feed consisted of one feed of ensilage and four quarts of grain (corn and barley) a day, with what she wanted of oats, straw and corn fodder cut together—no hay.

Red Polls for Beef.—As beef cattle, the Red Polls rank with the Devons, though they are somewhat larger, and mature a little quicker. But in form, color and general characteristics, they might almost be considered as Polled Devons, though, as a matter of fact, they have no Devon blood at all.

SUMMER FEEDING.

By H. C. THOM, Rock County, Wis.

Second Paper.

Raise More Grass.—Tame grass, timothy and clover, is conceded by all soil thinkers, to be a good thing with which to put neat fences around the farm, and paint on the house and barn, and secure a paid up subscription for an agricultural paper.

Then why not raise more grass? Pasture is better for land than meadow. Then why not more pasture? Wisconsin men grant that grain raising cannot be maintained year after year with profit. We have as good grazing lands as any in the States. Why not use them? Those who have been thinking and watching have concluded that their neighbors are not getting rich feeding cattle. Why? They might have done well in 1856. There must be some reason why they do not gather the dollars now. The truth is, we are paying a different fiddler now. Lands that our fathers secured for ten shillings an acre are selling for $75 now. We are wearing boots of another leather. The town assessor reports a watch now and then. Fresh meat has a pleasant smell. Our wives, God bless them, like music, society, dress. Labor has a tender skin, and the markets need a float. What does it all mean? We are trying to be like other folks.

A Problem to Meet.—Our fathers' lives were founded upon economic principles. Every out-go was met with most rigid economy. They labored from dawn till sunset. No rest. "Business" was a watchword as sacred as the blarney stone. The homestead came at ten shillings. They had few wants and no luxuries. Their plans made the farm pay. Nine dollars for pork, and seven dollars for cattle, was no uncommon thing. We have a different problem to meet. Land brings $75, a dollar and eight cents by the year. Old-time luxuries are present day necessities. We cannot farm as our fathers did, and make two ends meet. Grain raising is out of the question. Stock raising and beef-making is meeting with a Western competition that brooks no jesting.

Beef Cattle Interest.—The beef cattle interest of this country is assuming enormous proportions.

I could give statistics that would make Hoard's little Jersey cow swallow her cud in amazement. Some ingenious individual has estimated that a column, twelve abreast, would stretch in an unbroken line from New York to San Francisco. A large proportion of this vast army is grazing on government land, or land of nominal value, under a summer sun the season round. Every blade of grass is sweet and undefiled by trampling feet. They roam at their own sweet will, no fence to fetter their inclination, no bark of dog, or neigh of horse, to wake their dreaming but once a year. The herds are governed by foreign capitalists or home monopolies, and are thrown upon our central markets to compete with cattle which have been

grazed upon high-priced land, stabled and fed six rigid months in a year.

Better Quality of Beef Demanded.—It is sharply apparent that we cannot meet this competition with quantity. Our only remedy is to out-rank it with quality. In order to do this we must put ripe, well turned steers upon the market and deliberately down them upon the ground of superior excellence. How can this be done with the least possible outlay of money? As you know, the usual method is to raise or buy calves in the fall, put them through the initial winter on hay and then turn them out to grass in summer. Repeat number one process during number two winter, turn them out again and the third winter feed them as best you can, and in the spring sell and grope blindly for a profit on a three years' investment. The price usually obtained is a fair one considering the class of cattle turned. Whether the price you get is one of profit is a question depending largely upon the grade and character of the stock handled, and the existing price of feed. Everything must act conjunctively in your favor or the balance will make you smart.

Winter-Fed Steers.—Another method is to buy two-year-old steers in the fall, feed through the winter and sell in the spring. Let us look at this way a moment.

A two year old steer weighing 900 lbs. costs $28 in the fall. He eats $8 worth of hay. For 150 days he eats 20 cents worth of meal each day, or $30, making the actual cost of the steer the 1st of May $66. If the average steer weighs 1200 hundred pounds on the 1st day of May, he has done as well as is generally expected; at any rate he has done fairly well. Say he commands $5 per cwt. (which he probably will not do), $60, a net loss of $6, allowing manure to pay for care, risk, shelter and interest on the investment.

E. W. Reese's Plan.—E. W. Reese of Illinois purchased, Nov. 1st, 40 steers, which after shrinkage weighed 1100 each. He turned them on good pasture. Dec. 1st he began to feed corn and by Dec. 15th had them on full feed. May 11th they were sold and weighed, showing an increase of 5,520 lbs. on the lot. He fed 2800 bushels of corn worth 33 cents, or $840.

At the time he began feeding he turned in 23 weighed hogs, making a net profit above first cost of hogs and cattle of $499.20, a net loss of 16 cents on every bushel of corn fed. The cattle were regularly fed, watered and salted. They had all the corn they would eat and were fed in boxes so that nothing was lost. That man's hay vanished like the morning dew, and no one knows the profit thereof.

Relate Your Experience.—If you want any more encouragement on this line, weigh your steers in the fall, weigh your feed, estimate your hay, sell your cattle by the hundred in the spring and see how large a hole there is in the pocket where the profit dollars ought to be; Then stand up like a man and relate your experience.

The Way Out.—How out of this dilemma? For an apparent reason I have but few figures to support the subject of this paper. There is always a theory before a practice, and always a practice before a figure. The reason that I have so few figures, is that I have seen but few summer fed cattle. How many have? I mean a graded steer running on good pasture from May until December on full corn feed at the same time.

Iowa, Kansas, Missouri and Nebraska have been feeding cattle on grass and corn at the same time, and they claim

that it pays. But their estimates will not help us much. They don't weigh, as a rule; their climate is different. The most of their feeding has been done during short pasturage, when growing feed was short or dry or dead, and still they claim it pays. What I want is corn meal and luxuriant green growing grass. If they can make it pay under their condition of things, what's the matter with ours? The foundation to successful beef raising is good stock. Am I not right? The fancy stockmen who are present will convince you that blood tells without any aid from this paper. I will talk of cattle only, although nearly every statement regarding feeding applies alike to cattle and hogs.

Grain and Pork.—I received a statement a short time since from a good authority which said: "If we were to take all the hogs fattened in the United States in a year, and change the time from cold to warm weather, one-half of the grain now fed will make all the pork. This would be a saving of $75,000,000 annually."

Care of the Calf.—The key note to rapid cattle growth is good care of the calf during the first winter. Have a warm, comfortable place with a dry floor, give him liberty, good hay, ground feed two or three times daily. Let the main part be oats, the remainder barley or corn, with a little oil meal. The calves will walk out in the spring with the bow of an ordinary two-year-old. They have growth and frame. They are bright-eyed and active, have straight backs and the hair lays well. Then comes the grass. Wisconsin grows good grass. We would not have a butter and cheese record if she did not. Our timothy and clover have no equal as a meat producer.

Care of the Yearling.—These yearlings begin their second winter, stalwart fellows whose limb and barrel begin to show the round and graceful contour of maturity. For the second winter a tight shed on three side, open to the south, kept well bedded, answers every purpose. A manger on the inside of north, east and west, will do for the hay. It may have a grain box attachment, or a feeding box in the yard will do better, perhaps. Would feed enough to keep them in good growing condition. When grass is ready would arrange feed boxes in the pasture. It is not a good plan to turn 50 head of cattle into a hundred acre field to hunt for a white livered spear of grass that trembles as it looks around in fear that it has made a mistake in the season. By judicious feeding would have them on full feed in fifteen days, and keep them there until some man comes who has an eye in his head for something young, clean and fat at a fair price.

Two-Year-Old-Beef.—Two-year-old beef is too young for market, as we raise it. A three-year-old costs too much. Did you ever hear a man say that a three-year-old ate his head off the last winter he was fed. Our summer fed steer is going to drop right into that big hole between the immature beef and a three-year-old with his head eaten off. He is two years and six months old and will cover the block before the third and fatal winter comes. He has a free and easy action. He is not strained by dry hay and dry corn. You have not an eager, pushing, hungry and frozen animal to feed all winter. Cattle lice don't mow hair and corn at your expense. You don't pitch manure out of the back door every winter morning to run over on your neighbor's farm next spring. You don't spend three or four weeks of beautiful weather drawing out the husk of manure that is left after Jones gets the meat across the line. You are not

feeding 60 per cent. of your grain and hay that you may maintain a fire, that your charge may live. If you do not carry these hulking, hungry fellows through the winter, the hay you save is a clean, salable product of your land. Hay pays about as well as any plant grown on the farm.

How to Make a Good Steer.—After you have a steer through the second winter, in an off-hand way that looks toward liberty and comfort, you have growth, frame, and condition to start on; a summer sun, quiet shade and tempered water to aid you; green and succulent grass that is infinitely better than any mow or silo can furnish; a climate and condition of things that will make more than two pounds of meat, where you made one on the same feed in winter. Sufficient feed to keep an animal from losing in winter, will fatten him in summer. Your manure is of number one quality, well distributed, without waste or labor, and above all you have a steer that *is* a steer. In symetry of outline, in maturity, in fat, in handling quality, in every point that goes to make up a butcher's pride, you have a living example that will make any lousy, half-haired, manure-bedaubed, winter, stall-fed steer crawl into a hole that his summer friend can't get into by 400 pounds.

The Great Drouth of '87.—Wisconsin suffered, as no part of the north central states suffered, last summer. Last year I cut four tons of hay to the acre; this year I did not set up the mower. Ground that yielded 58 bushels of barley to the acre, was not worth the cutting this year. Our pastures were white as the Sahara, and the shimmering waves of heat arose from their panting bosoms to the sun again. Conservative farmers stood aghast. What was to be done? Hungry, lolling cattle panted and lowed about the tanks. Nothing to eat. No protection from the burning sun. Cattle run down. Cows dried up. Meadows, grainfields and cornfields were thrown open. Trees were burned to the trunk. Sheep were given away and driven from the country. Cattle were turned into brewery yards, and still many were left. Human sharks fell upon the poor farmer, and the cattle had to go. One dollar per cwt. bought them, kept from feed and water 12 hours and then driven 10 miles to weigh. Good milch cows changed owners at from $7 to $10 each. Good grade two-year-old steers went crying for buyers at $12.

Summer Feeding.—I was no less alarmed than my neighbors. I had determined the preceding winter to feed in the summer when my usual pasture had succumbed to the drouth. I opened the meadow gate. When the meadows were gone I shut the cattle in the barn from six in the morning until sundown, and fed them green stalks and corn meal. I found them too lax and regulated with bran. When night came I gave them liberty and exercise. They would not drink more than a small pail of water each, at noon time. I never saw cattle do better. The 9th of August I sold them for $4 per cwt.—the 9th of August when the sun was as unrelenting as fate. Falling water was a stranger to the thirsty earth, and clouds had been forgotten by the anxious husbandman. I weighed the cattle when I turned them out in the spring, and again when I sold. I knew the amount of corn fed, saw a profit and let them go. If one can make money on cattle, when the market is going down every day, with the elements against him, and the earth bearing nothing, the assumption seems safe that money can be made on cattle under favorable circumstances.

Get Out of the Rut.—Why have we not tried this method before? We are conservative. Our fathers fed the old way and did tolerably well. Some of them put a stone in a bag to balance a bushel of wheat across a horse. Need we? They had the advantage of us too. Land was cheap. No Western competition. Their wants were few. Why don't we believe as they did? What's the use of being a Roman? We are a sort of hand-to mouth tribe. If we can make grain and hay last until hay grows again, we draw a long sigh of relief and begin the new year with the old leaf fluttering to the wind as ever before. Because corn costs 24 cents to produce it, it is no evidence that 24 cents is all it is worth. Buy corn if cash and credit do not blush to meet you. Buy corn until you get a start, and when you get your start sell your hay and stay started. If your corn has a market value of 40 cents and you can get more than 40 cents by feeding it, you can make a profit on your neighbors' corn at 40 cents. Manure your land with some one's else grain who does not see as you see. The more grain of any man's raising that you can feed, the more cattle you can keep on your pasture.

Good Beef Wanted. — Stockers, feeders, scalawags, old cows are sold to third rate butchers or hurried to the stock-yards. Bargain drivers are willing to minister to your wants. Our summer steer is not a competitor of this class of cattle. Neither is he a competitor of the great flood of Western cattle. The local respectable butcher must have some good beef to sandwich with the great fall's clearing. He is willing to pay something near a fair figure for somethiug to justify his pretentions. He wants a good quarter to hang on the first peg next the door.

Turn to a summary of market reports for the past twelve years, and you will find many of the November and December quotations low.

Grain Fed Cattle.—Pastures will support a third more grain fed cattle than they will if they are unfed. And when your plow glides under the rich green sward and you ask your farm to stand by you in an emergency it will respond like a thing of life.

You may say cattle don't bring anything in the fall. Very good. As a rule they do not command a very high price, that is such cattle as are usually turned off.

Fat Not Big Cattle Wanted.—Short-sighted farmers are appalled at the sight of snow. They have miscalculated. No room. Unexpectedly short crops. Money close. Tax time near at hand. Cattle unfitted for market. No preparation for this emergency. They must go. But near the top you will find good cattle bringing good prices. We make a mistake in fitting cattle for the market; not big cattle but fat cattle. Don't keep a steer three or four years to make him big; I know you like to have your friends come over and see something big, but it is expensive pride. If you can combine size and finish, so much the better. By all means have them fat, if you want the top price. This fall's quotations showed 1,200 pound cattle bringing more money per cwt. than 1,200 pound steers. For this class of cattle the November and December market rarely falls below that of March or June, and often outranks it. Will the plan work? Try it. Any plan that has in view the hanging of a good quality of beef on Chicago and New York hooks at a fair profit, is worth the trying.

Discussion.

MR. KNIGHT.—Is it more profitable to sell those cattle at fourteen months than at thirty months?

MR. THOM.—The thing is, we are meeting the wants of the market. It is not heavy cattle that the market wants now, it is well finished cattle, that will weigh 1200 or 1300 pounds rather than those that weigh 1900. It is the finished steer that we want, the steer that is well made, that is young, and fat distributed evenly over the body.

MR. HARDING.—I found it paid better to turn cattle on old pasture than on clover and timothy.

MR. THOM.—I arrange that matter with bran. I have never had any clear clover pasture. Timothy predominates in my pasture, but one of the features that made me begin this line of feeding was that if the cattle were taken off the dry hay and corn in the winter time, and turned out on the pasture without anything, loss was sure to follow. I never have had steers that refused to eat. You will find the feed vary according to the amount of dew or wet on the grass, different days. Sometimes they will fill up and eat scarcely anything, but as a rule they will feed right along. That is verified, too, by dairymen who find that cows take to the grain feed as readily as they do in winter. If you have a straw-stack in the summer, it is good to let them run to it, and a little hay. I fed right along without roughage.

PROFITS IN BEEF PRODUCTION.

By A. A. ARNOLD, Trempealeau County, Wis.

Third Paper.

Requisites Required.— Profits in beef production depend upon the quality of the animal, the quality of the food and the quality of the care. A neglect of the requisites in either of these will as surely diminish or totally dissipate profits, as a neglect of either will in the production of butter or cheese.

Lands and Labor Too High. — Lands and labor are too high in Wisconsin to permit slovenly methods in any kind of husbandry. Nice, tender, juicy, deep-fleshed and marbleized beef that suits the appetite of the epicure always finds a ready market, usually at paying prices; probably with less fluctuation than any other commodity that can be named. Therefore the farmer who has an eye, the taste and the art, for making fine beef, if he will observe the requisites, may make it as profitable as any other branch of animal husbandry.

Values Compared. — I submit an estimate of the value of the various parts of two steers of equal weight, showing their total value when on the block. I will first name the parts of the ill-formed steer, and then the well-formed, with the proper weight and value of each part, and then the total value and the difference in the value of the two steers. From this it will be seen that the

valuable meat lies in the hind quarters, the parts that are poorly developed in the scrub. It will be seen, also, that the poor steer dresses fifty per cent., and the good steer sixty per cent. of their respective gross weights. The total weight of each steer is figured at 1,400 lbs., which is heavy enough in each cow to bring first price in beef markets, prices varying more than this, as between light and heavy weights.

Hind Quarters.

	Ill-formed Scrub Steer 1400 lbs., dressing 700 lbs.			Well-formed grade 1400 lbs., dressing 840 lbs.		
	lbs.	*per lb.*	*Am't.*	*lbs.*	*per lb.*	*Am't*
Loin	117	15c	$17 55	192	20c	$38 40
Round	65	10	6 50	100	15	15 00
Rump Roast	30	8	2 40	36	10	3 60
Flank	24	5	1 20	24	6	1 40
Soup Bones	36	2	72	36	2½	90
Kidney	12	1½	18	12	2	24
	284	...	$28.55	400	.....	$59 54

Showing a difference in value of $30.99 in favor of the good steer.

Fore Quarters.

	lbs	*per lb.*	*Am't.*	*lbs*	*per lb.*	*Am't.*
Lo'n Roast	70	10c	$7 00	90	12c	$10 80
Shoulder "	175	8	14 00	185	10	18 50
Boiling Meat	95	5	4 75	89	7	6 23
Neck	40	4	1 60	40	5	2 00
Soup Bones	36	2	72	36	2½	90
	416	...	$28 07	440	....	$38 43
Offal	700	1	$7 00	560	1½	$8 40
Total	1400	.....	$35 67	1400	.....	106 37

Showing a difference of $10.36 in favor of the good steer—a difference of $12 75 in butcher's value, and from two to four cents per lb., gross weight, in the Chicago market, no matter whether price of beeves rules high or low.

Quality of the Beef.—The quality of the beef depends first upon the quality of the animal. The steer must be born of a beef producing race with well developed crops, loin and ham. These with well arched ribs, a bright intelligent protruding eye, a good broad muzzle, a short head, a long broad loin, soft waxy looking horns, a mellow skin, a thick fine coat of hair, and built well down to the ground, will indicate a good feeder, with meat where it is wanted, which means an animal machine with a good constitution, good nerve organism and good digestion that can assimilate a large amount of food.

Quality of the Food.—The quality of the beef also depends upon the quality of the food. In the young animal the feeder must look to it that the food be of a highly nitrogenous quality, thus giving an opportunity for the growth of bone and muscle, for the animal cannot elaborate or utilize what is not in its food. The first care of the stockman should be to produce a good frame of bone and muscle on which to build the useful animal of any kind.

The Finishing Off—Must be done as rapidly as possible with more carbonaceous foods so as to marbleize the beef by filling up the tissues between the muscles with fat; distributing it well through the system, giving the animal a smooth and not bunchy appearance, just the thing to please the epicure, but not the best process to produce the most valuable breeding animal. The succulent grasses, with a grain ration, give the most satisfactory returns in gain of pounds, for thereby there is more water secreted in the flesh, a condition most satisfactory to the producer because the most profitable, and the most acceptable to the consumer because the most palatable. When grass is not obtainable, ensilage or roots form good substitutes, and will promote rapid growth in winter.

Early Maturity—Is most desirable, for on this, in a great measure, depends the profit, and quick returns. It costs nearly twice as much to make a pound of beef the second year as the first, and

he expense is constantly on the increase as age advances. Young, quick-made beef, and that in the right place and quantity, can only be made with well bred animals or their crosses, and by keeping the animal machine constantly at work utilizing its food.

Profits in Feeding.—The profits in feeding consist in what the animal appropriates in flesh after sustaining life, so that when only enough food is given to support life there can be no profit, and all profit comes from what is consumed and appropriated above the life sustaining point.

Care, Handling and Exercise—Has much to do with the growth and welfare of the animal. Upon the condition of the nervous system depends its profit, for we see that no animal thrives and produces well in any form unless it has a good nervous organism, and this cannot be well and evenly sustained without kind treatment, good air and proper exercise. At the finishing off but little exercise is wanted, but it should be voluntary, with little effort on the part of the animal to get its food, and so arranged that a mixed and liberal diet can be obtained at will.

Food is best assimilated when taken as the appetite craves, and no person can dictate the quantity and quality so well as the animal itself. Any kind of food, no matter how rich, is valuless to the animal, unless partaken of with a relish, for at such times alone do the organs of digestion and assimilation perform their proper functions.

Muscular Animals—Are the most valuable for food. Muscle when eaten produces bone and muscle, while fat keeps up animal heat, or again forms fatty or dead fiber. Muscle is emblematical of life and utility, while fat is only indicative of consumption—a burning-out or death. Muscle is inherited and can be developed by food only to the point limited by its heredity, beyond which it can only be developed by exercise. Fat may be increased at expense of muscle, as we often see where there is a lack of exercise. Fattening is the first step toward disease, and if too long continued will finally end in disease and death. Therefore quickly fattened animals are the best and healthiest, and bring the best price in the market. Where the climate is not too severe there is no doubt that open air is the most healthy, and therefore the most profitable; so that when this is not practiced we must approach in this regard as near as possible to natural conditions, which are pure air, nutritious diet, with water and exercise at will. Beef made in this way is the best and most healthful and, everything else being equal, brings first prices.

The Well-bred Steer — Responds best to liberal keep, and can be made to weigh as much at 20 months of age as the scrub will with same opportunities in from two to three years, thus saving in food, and in time from four to sixteen months. The good grade, or full-blood Shorthorn steer, will, with proper food and handling, yield as good net returns as the well-bred cow, while the scrub steer, with poor keep and handling, will not do better, if as well as the ill-bred cow with scrub management.

No Room For Scrubs.—There is no room for scrub management or scrub steers in Wisconsin. The farms of the West can furnish all that is wanted of these at less cost. In the best there is profit; in the poor there is loss. In the best the farmer can take pleasure; with the poor he feels his inferiority, and deplores his poverty. Farms on which steers are fed for market are constantly

growing richer, making them banks of deposit, which will always honor the drafts of the depositors. The liberal feeder is the well-to-do man, a pleasanter man to live with—the man who laughs the loudest and lives the longest.

MERITS OF THE JERSEY.

By T. L. HACKER, Dane County, Wis.

Fourth Paper.

A Great Source of Wealth.— As dairying in this State is becoming one of its greatest sources of wealth, it is a matter of the utmost importance that the cow employed shall be one that shall produce the greatest amount of butter or cheese for the food consumed and labor employed.

The Ideal Dairy Cow.—The friends of the peerless Jersey believe, that to all practical and unbiased minds, she has solved the problem; indeed, she is now generally recognized as the ideal dairy cow. A scrub or native cow requires the same feed and care that the thoroughbred does, and, while there are some good milkers among them, the majority do not pay for their keeping, and the dairyman who keeps them, when the improved breeds are so reasonable in price and so much more profitable, is a long way behind the times to his great loss.

What Jersey Blood Will Do.—To illustrate what an infusion of Jersey blood will do: In 1875 Mr. Mowry's herd of native cows averaged 125 pounds of butter per year per cow; in 1880 the herd consisted of grade Jerseys, and the average was 187 pounds per cow; in 1886 they were one-half thoroughbred, the rest grade, and averaged 276 pounds, and the following year reached 300 pounds per cow. It should be borne in mind that the food of support was as great during the first period, above mentioned, as it was during the last, that is, it took just as much feed to support the 125-pound cow as it did the 300-pound cow. Herein lies one merit of the Jersey.

Richness of Jersey Milk.—Another point in her favor is the extraordinary richness of her milk. I do not remember a single instance where it required more than 20 pounds of milk to make a pound of butter, and there are instances where 3½ pounds of milk only was required to make a pound of butter. It also requires less time to milk and care for three or four than six or eight gallons of milk which is quite an item on a farm, and it is a manifest absurdity to use a cow for hydraulic purposes when a pump would answer every purpose at far less expense.

As a Butter Cow.—The Jersey has become famous as a butter producer, through the large number of authentic tests, which, large as the list is, falls far short of doing her justice, as comparatively few have ever been tested; of these there are some fifteen with yearly rec-

ords ranging from 511, to 936 pounds of butter. This is the only dairy breed that having been "bred up," to such an intensified dairy animal, will endure such a prolonged test without showing an indication of putting on flesh, or in shrinking in butter product.

Large Yields.—We have 18 cows with monthly tests ranging from 64 to 112 lbs.; there are at least 7 cows with weekly tests of 30 to 46 lbs.

Of the group yielding 25 and under 30 lbs., we have 15; of the 24-lb. cows, we have 6; of the 23-lb., we have 12; of the 22-lb., 16; of the 21-lb., 21; of the 20-lb., 30; of the 19-lb., group, we have 42; of the 18-lb., group, 60; of the 17-lb., group, there are 100; of the 16-lb., group, we have 182; of the 15-lb., group, there are 237, and of the 14-lb., group, 400 tested cows. How many untested Jersey cows are there that can exceed 14 lbs. of butter in seven days? Probably more than a thousand in America.

Many of these large yields were made without any grain feed, while others received only a small ration.

As a Cheese Cow.— Another merit has our ideal cow in her ability to make fine cheese and more of it than any other. In every public trial where she has come in competition with other breeds, supposed to greatly excel her in cheese at least, she has beaten them one and all, absolutely and entirely.

Summary.—To sum up her merits: She is by far the best milch cow, giving a uniform flow through the year of the most delicious milk. Best for cream, because, she yields a large amount—rich in butter fats and superior in texture. Best for butter, because she gives the largest quantity, with the finest grain, the most beautiful color and delicate flavor. Best for cheese, giving milk so admirably balanced in fats and caseine as to yield the largest percentage and of the finest quality. It has been established that the Jerseys earn more money for the food consumed and labor employed than any other breed.

Jersey Blood.— So then, it is for the best interests of our farmers to have an infusion of Jersey blood in their herds, and the best way to secure it is to use thoroughbred sires from good cows of good family. A "phenomenal cow" in his pedigree would certainly do him no harm, as "blood will tell."

MERITS OF THE SHORTHORN.

By GEO. HARDING, Waukesha County, Wis.

Fifth Paper.

Fertility of Farms.—In my talk on the merits of the Shorthorn as a breed, the future fertility of our farms will be one of the main considerations. The present profits, although equal to other methods of farming, will be looked at as tributary to the future. I have nothing wonderful to say, but hope, from my twenty years' experience in cattle, that I may say something that will be of interest to those of you who aim to make money with farms under condi-

tions that I think Shorthorns will meet better than any other breed of cattle.

Value of Pure-Bred Cattle.—The value of pure or line-bred cattle over those miscellaneously bred, is in the uniformity of their descendants. In placing any commodity in the market our first aim should be quality, next uniformity; and we cannot produce uniformity in cattle without using a standard breed that is known to produce the desired quality.

Shorthorns for Beef.—Shorthorns for the production of beef stand second to none, as we find them as long ago as 1600 in the valley of the River Tees. They were then noted as a grazing beast and dairy cow, although the attention of the world was not called to them until about 1800, when, through the enterprise of the brothers Robert and Charles Collings, prominent breeders of that day, animals, wonderful at that time and even remarkable at this, were traveled by them over England, drawing the attention not only of those interested in cattle husbandry in England, but also representative Americans, which led to numerous importations to America.

Dairy Qualities.—Among other English gentlemen whose attention was brought to them at this time, was Jonas Whittaker, of Yorkshire, Eng., a large manufacturer, who from necessity was seeking a dairy animal to produce milk for his operators, and proceeded to collect a choice herd, chosen from the best families and noted for their dairy qualities; and individuals from his herd were afterwards imported into New York State, and laid the foundation of that State's reputation in the dairy. That the dairy qualities of Shorthorns in the hands of Whittaker and Thomas Bates were not a detriment to them as feeders, is shown by the success of these gentlemen in showing animals of their best dairy families in competition against all other breeds in the prize ring.

Early Importations.—Shorthorns, when imported to this country from 1785 to 1800 in the East, were commonly spoken of as the "milk breed," and in fact were transported to Kentucky, under that name to designate them from cattle of other breeds, brought in about the same time; but while making the reputation of New York as a dairy State, they were surpassing all other breeds in Ohio and Kentucky, in furnishing a first class beast, that the enterprising cattle men of that section were enabled to drive over the mountains and compete at a profit in the New York market with any competitors.

Breeding for Beef Only.—There is no doubt that Shorthorns have been bred in the West for beef only, to the detriment of their dairy qualities, but in my opinion it is not necessary to sacrifice the milking quality of the Shorthorn to produce an animal that is a first-class grazer and a producer of first-class beef.

Points of the Beef Shorthorn.—The Shorthorn that has been bred for beef in comparison with the dairy type carries a large proportion in the front quarters, whereas those bred on the other model are much heavier in proportion in the hind quarters, where we find the most valuable meat.

As we all know that the butchers make a difference of from one to one and one-half cents per pound between the forward and hind quarters, I commend the Shorthorns to the farmers of Wisconsin as a breed that will mature early, furnish the best quality of meat in that portion of the carcass which sells at the highest price per pound.

For the Home Dairy.—The heifer calves, if properly bred, will mature into cows that are second to none at the pail

The farmer with 200 or more acres of land located too far from the factory to make cheese-making profitable, and not wishing to be a specialist as a butter maker, will, in the Shorthorns, find an animal that will consume the rough feed of such a farm at a profit, and also respond to grain feeding equal to any other breed of cattle, and when we add their superiority for the dairy over the other beef breeds, I feel safe in advising the farmer located as above to examine carefully their merits, as I believe the future profits of such a farm will be controlled by the selection of the breed of cattle best adapted to meet these requirements.

Value as a Sire.—The value of the Shorthorn as a sire to improve the grade cattle that now largely occupy our farms, cannot be over-estimated. The apparent improvement in the feeding quality of their grades, and that they seem to retain the milking quality of the dam, are remarked by all those familiar with the subject, and when such grades have come into competition with the gilt-edge dairy breeds, they have surprised their competitors with their remarkable performance, and often carry off the prize over animals bred for generations for the dairy. The steer from this same cross have carried off the highest honors when in competition with the best pure bred animals of the different beef breeds.

The last two seasons the product of the dairy has been high as compared with beef, but all know, who have paid attention, that it is only a matter of time when we are likely to see the reverse—in fact, we already have an improvement in the price of cattle.

Make Changes Carefully.—In closing I would say to those who are following a certain plan, do not change without careful investigation, for the farmer who is controlled by the fluctuations of the times will generally do business at a loss.

Map out a plan best adapted to your farm and surroundings, follow it steadily, using the best animals you can obtain in your chosen line, and those of you who are ambitious to improve the fertility of your farms, I would advise to examine the merits of Shorthorn cattle, and mutton sheep as an accompaniment. And too my fellow breeders who believe that the beef type of Shorthorns should be our aim, I would say, beware of sacrificing the grand old type of Shorthorns, that when on the butcher's block carried off the carcass prize by the wealth of high priced loin, in comparison with the low priced brisket.

MERITS OF THE HOLSTEIN.

By JOHN URQUHART, Columbia County, Wis.

Sixth Paper.

Origin of the Breed.—The remote origin of the Holstein breed of cattle affords a theme of unlimited speculation, according to tradition. However, as stated by the best authorities, all that is certainly known of this breed of cattle is that, for an indefinite period anterior to the records of history, there existed a superior breed of cattle in the Duchy of Holstein, in North Holland and Fries-

land. To give you some idea of the antiquity of this breed of cattle, I will quote from a French historian who wrote in 1350: "As we besieged the enemy, we had to get our supply of butter from Holland." That country had been famous for its dairy products for 500 years prior to this time. The historian, Motley, in the seventeenth century, says that the most famous cattle in the world are those of Holland for milk, butter, cheese and beef. It is exceedingly difficult to obtain trustworthy information relative to the various races or breeds of cattle on the European continent. It is known that for over 200 years Holsteins have been imported to England to improve the stock, for the people very early appreciated the pre-eminent dairy qualities of this breed, as they had been bred for so long a time for milk, butter, cheese and beef. But their main staff of life was the butter and cheese. Breeding for this one purpose, none but the fittest survived. All the poor stock was sent to the shambles. The people lived with their stock and attended to their every wants, for they derived the most of their sustenance from the cow. She had the best of care, and, as you know, care, feeding and breeding make the cow. This long line of breeding, and the best of care, have developed a breed of cattle that has no superior for the farmers, to-day.

Holsteins in the United States.—There had been a few of these cattle imported into the United States as far back as 1625, but they were not kept pure, so that they soon became extinct by crossing with scrubs. There were several subsequent importations, but were not kept pure. In 1861, Mr. Chenery, of Massachusetts, imported one male and four females, which have been the foundation of the Holsteins in this country. They made very slow progress the first 20 years after their introduction, but as their merits became known the demand for them increased. In 1881 there were 2,782 registered Holsteins in this country, and now there are about thirty-four thousand, a wonderful growth in seven years, and, I think, merited by this noble breed of cattle. They are scattered from Maine to California, and giving the dairymen the very best satisfaction; there are a number of the bulls used on the ranches with the very best results. As they are good rustlers, strong and vigorous, their grades are thrifty, and mature early.

Prepotency.—The strong prepotency of the Holstein is a marked feature of this stock wherever introduced; you will almost always find the grades black and white. The first bull that I bought in two years got 223 calves from a promiscuous lot of cows, some of them being registered.

Every calf was black and white. I never saw or heard of a red calf from any stock that I sold.

Blood Will Tell.—In the Holsteins, we have a grand dairy breed of cattle, and I hope breeders will not lose sight of their dairy qualities, go to breeding for beef, and spoil this grand breed that has been brought so near perfection for the dairyman. A combined machine never works well; profit by the experience of others, and don't try it. I don't believe in a general-purpose cow, but I do believe in taking all the purpose out of stock that is in them.

Grades.—The grades of this breed are used in most of the great butter and cheese localities in this country with great profit to their owners, as they give a large flow of good, rich milk and are very persistent milkers. The steers fatten easily and fully as cheaply as any other stock, which has been demonstrated by disinterested parties. I believe

that the Holstein breed of cattle will produce a greater number of profitable cows, thoroughbreds and grades, than any other breed that I know of.

Milk and Butter Records.—I might quote you almost phenomenal milk and butter records that have been made by this breed of cattle. Just think of a cow giving 2600 lbs. of milk in one year, and 100 lbs. of butter in one month. A few years ago you couldn't get any one to believe that a cow could be made a machine to produce that amount of milk and butter; but we had to wait for a Holstein cow to do it. The Holstein cow is well fitted in her nervous make-up, to make these large records, as she does not waste her nervous energy in chasing real or imaginary shadows, but devotes her time in asimilating the food consumed in making milk to make butter and cheese, which means dollars and cents for her owners.

Sensational Records.—I don't believe in over-feeding and crowding to make sensational records. There are more good animals spoiled by over-feeding than we are aware of. Feed your stock well and regularly and you will get the best results, and the stock you sell will give the buyer the best satisfaction, as they will have a chance to improve on his hands.

Skim-Milk Cows.—The Holstein cows have been facetiously called skim-milk cows, but you will also find it true that wherever they have been publicly tested they have invariably beaten their competitors in giving more pounds of milk, more pounds of cream, more pounds of butter, and, if you will, more pounds of skimmed milk, which, by the way, as Prof. Henry says, is worth nearly 90c. per hundred, if fed with corn, to make pork. The skimmed milk of a good Holstein cow, fed as above, will make more dollars and cents than three-quarters of the cows in Wisconsin will average this year in milk and butter.

At New York Dairy Show.—At New York, last spring, the greatest dairy show in the United States or Canada was held, and the very best cows that our country could produce were marshalled there in battle array, every one thinking his favorite the best. There was a golden cup, on which was engraved a cow, to be presented to the owner of the best dairy cow at the show. The Holstein filled the fondest hopes of her admirers, by winning first, second and fourth, and within one oz. of winning third—almost four premiums out of the five offered. She also won the golden cup and filled it with honor until it overflowed. Not much skimmed milk about that cup. This is a wonderful record to make when we take into consideration that there were the best cows in this country that the Holsteins had to compete with. This is only one of the many victories the Holsteins have won. I might quote you others in quantity and quality of butter at other shows and tests; suffice it to say that the Holstein cows of this country will produce more 20-lb. or over butter cows than all the other breeds combined.

Merits Enumerated.—It is true that one robin don't make a summer, but when they are scattered all over the land summer is here. The Holstein cow has merits in her large flow of rich milk, and its good keeping qualities; in her fine flavored butter, and its good keeping qualities, commanding highest market price in the best markets. The Holstein cow has merits in her kind disposition; in her strong constitution and strong prepotency in impressing her characteristics on other stock. She has merits at the pail, at the churn and at the cheese vat, unsurpassed by any

other breed. She has qualifications that commend her to the farmer, to the artisan, to the preacher, to the lawyer, to the general, to the governor—in fact to every one who admires a good and profitable cow. The Holstein cow has won laurels in her native country; she has won gold medals and honors in her adopted country. The cry comes from over the sea, and is echoed through the length and breadth of our land, crown the Holstein cow queen of the dairy.

MERITS OF THE JERSEY.

By GEO. E. BRYANT, Dane County, Wis.

Early Predjudices.—At the first convention held by the Wisconsin State Agricultural Society in 1875, I read a paper on Jersey cattle, published in Vol. 41, of the transactions of said society. After I had read it, George E. Morrow, the organizer of farm institutes, advised me *not* to hand it in for publication, because, he said, it was too bitter in its sentiment. I replied, that if I had stepped on any man's toes, I was glad of it; I meant to do it. The Shorthorn men—Stilson, Ludington, Williams, held up their hands in holy horror, when I proposed that the Jerseys, which two years before they had laughed out of the premium list, should be put on a par, in fairness and in merit, with Dukes and Duchesses. The only men who commended the paper were Dr. Horne, Gen. Geo. P. Delaplaine, and the editor of the Jefferson County Union. Fifteen years have passed around, and Hiram Smith has ceased to make butter from "dunghills." He came to the Jersey slowly. He tried Hazen's Ayrshires, and found that gristle was not what he wanted; he tried the Holsteins, and found that a soup cow was not the machine for making prize butter. Hiram was more honest than Hazen, for when he bought him a Jersey bull he frankly said he was going to raise some grade Jersey heifers.

Changes of Fifteen Years.—Favill, an old-time dairyman, an honored man, kept saying for years "that cheese came from clover and bran, and it did not make much difference what the breed was that chewed it." I am told that a breeder of Shorthorns—who to distinguish himself, rushed into print some years ago to abuse my cattle—has all grade Jerseys now, including his bull. Fifteen years have worked great changes. The Jerseys with their horns on don't have to fight for their rights at fairs. They have beaten all other breeds in daily, weekly, monthly and yearly butter production. You see their profiles on milk wagons, cream jars, cheese tubs and butter firkins. They are the pride of the rich, the joy of the poor and the money-gatherer of the dairyman.

Heredity.—What is her bane? Solid color craze, grade Jersey bulls, phenomenal cows with *no* heredity, and dishonest men and women! The only question in the selection of a bull, by the

most judicious Jersey farmer was, "is the bull a good one," meaning solely had his progenitors, near and remote, been renowned for their milking and creaming qaulities; had he an heredity that was safe to build on? To-day too much stress is put on solid color, black tongue and black switch. Some insist that his mother must have been a great milker, and if she was, stop there and are satisfied. *Heredity* means more than that. You want of the family that are *all* great milkers. Don't bank on a great grandson of a purely phenomenal cow, with little other backing; but rather put your trust in the family of creamers. Place not your faith in pictures, and weigh well the words from the silver tongues of men and women in high places. Samuel J. Tilden's Jerseys were pretty to look at; Jersey Queen of Burnett was speckled, but the hills of Vermont graze many of her descendants that are renowned at the pail.

Grade Bulls. — Grade Jersey bulls have spread over the country and greatly injured the good name of Jersey. Poor, ordinary cows, called Jerseys, are getting too common—a half-blood and a quarter-blood, bred together, producing a scrub, and most times a poor scrub.

"Omaha."—I once owned a bull called Omaha who became somewhat famous as a getter of great creamers. He has been dead eight years, but if any of you want Omaha yearlings—two-year-olds or three-year-olds — let it be known and you can find them. There are hundreds of them in this country, and as feed is scarce they are for sale cheap. "A good name is rather to be chosen than great riches," and that is the reason so many insist they have Omaha's daughters. Speed comes from the Arabian horse. Why?—because since God made the horse he has been bred by the Arab for speed only. The island of Jersey is within daily communication with the great markets of Paris and London. The island is a great garden, and the surplus of its vegetables for generations has been food for cows, persistently bred for cream not beef. There is heredity in the Arab horse; there is heredity in the Jersey cow. Do not condemn and find fault with her because some people mongrelize her. Breed her up and not down, and she will pay big interest on her keep.

"Badger Girl."—N. N. Palmer's Badger Girl is a great cow. Why?—because she has inherited from sires and dams, near and remote, her creamy qualities. Some years ago a Wisconsin horse breeder said, "the fun in breeding is the uncertainty of it." Cow breeders don't want uncertainty; they want to be sure of a "creamy" heifer every time. Now Mr. Palmer is sure of a cow that will make two pounds of butter per day every time Badger Girl has a heifer calf by his bull Gold. Why is he sure? Because Badger Girl made it; her dam Fanny Badger made it; her granddam Metah's Queen made it; and her great granddam Metah produced a half dozen daughters that made it. Gold is from a cow that made it. I have made the above illustration to show you an established heredity, and that is what the breeders of Jerseys should aim for.

Quit Breeding Scrubs—For blood will tell. Do not dishonor them. Let the "muleys" do the bunting. Breed for cream and not for color; breed for families of creamers, and not go wild or let yourself be fooled over a phenomenal cow, for blood will tell when records fail. Shun a grade bull as you would the devil—he is a horned evil. Be honest in your deal, and don't claim your cow makes forty pounds when she only makes twenty. Lies will not help a Jersey. She is honest as were her first breeders, the followers of King John.

MERITS OF RED POLLED CATTLE.

By E. W. KEYES, Dane County, Wis.

Seventh Paper.

A Progressive Age.—In this day and age, when there is such an extraordinary reaching out for the attainable in science, literature, and art; such a growing desire among the farmer class, for the best improved methods in agriculture; such a progressive spirit among the people, inspired by a determination to devote the necessary time and money for the better education and higher enlightenment of the producing classes, it is but natural that every new idea that points in these directions should be received with great favor, and be at once submitted to the crucial tests of investigation and experiment.

During the last decade such a great advance has been made in scientific agriculture, in applying the highest principles of art and skill to the processes of dairying, and generally to the successful development of thought and action, sure to result in benefit and advantage to the farmer, as to be almost wonderful.

A Question of Breeds.—While all this and much more has been going forward, the attention of the stockman has not been idle, and the farmer has not lost sight of the great question of cattle breeds, and the subject at present of paramount importance with farmers in relation thereto is, which breed is able to present the best general purpose animal. Perhaps the problem is nearer solution than many suppose. The breeding of pure-blooded cattle, of whatever breed, is carried on principally by large farmers and stockmen, representing liberal capital, who engage in the business in anticipation of large profits and who are really speculators, booming their particular breed with a sound and reverberation that echoes throughout the country. Due appreciation is paid to the several good breeds of cattle now occupying the greatest share of public attention. I do not desire to decry any of them. It would seem that the Shorthorns, the Jerseys, and the Holsteins hold the lead at present. But the great question is, do they fill the bill; is there not something better? I shall attempt to show, before I conclude, that there is. Many persons who have been exposed to certain subtle influences are likely to become what is termed *crazed* upon particular subjects in other words, *cranky*. The farmer may have had his lightning rod up, and been struck with the cattle *craze*—either Jersey, or Shorthorn, or Holstein *craze*—and become so impressed thereby, that no argument could convince him that his particular breed was not the best in the world. In general however, the great majority are open to conviction, and ready to change the scrub for the better, and to press on until the best is obtained. Close observation and careful experiment have done much in the past toward bringing to the front the best breeds of cattle.

The Holstein Craze.—When the Holsteins were first attracting attention,

the Board of Regents of the University made purchase of several head of fine bloods, for the purpose of experimentation. It was claimed in their behalf that they were the greatest of milkers, and I remember that my old friend and associate on the Board, the Hon. Hiram Smith, bore this testimony, and mainly through his recommendation the purchase was made; not long subsequently (the Holsteins in the meantime having graduated), the proposition was made in the Board for the purchase of some fine blooded Jerseys, for the same purpose as the Holsteins, and it was strongly advocated by brother Smith, who claimed that the Jersey was the dairy cow, *par excellence*.

Experiment in Cattle.—Not knowing then as much about the milking merits of different breeds as I do now, I expressed surprise at his apparent change of front, and called him to account. His reply was prompt and satisfactory, and to the effect that on the experiment farm we had tried Holsteins, that they did not come up to expectations, and that now we should give the Jerseys a trial, concluding with the statement that an experiment in cattle, or anything else, though a failure, may prove as valuable as if it had resulted in a grand success.

The breed of cattle best adapted to the farmers of the west, those who grow upon their farms a variety of products, is one which combines the two great essentials, milk and beef. I presume there are none to contradict this proposition, as, without argument or elaboration, its truth must be admitted by every intelligent farmer. The benefits and advantages to result from breeding such cattle are too well known and understood to need any evidence here.

Red Polls in the United States.—I make the plea in behalf of the *Red Polled cattle*, and claim that they come nearer to this requirement than any other breed of cattle under heaven. They have been long bred in England, where they originated many years ago; of the same color and general characteristics as at present, and have consequently become one of the most fixed and distinct breeds of that country. The first regular importation to this country was made in the fall of 1873, by G. F. Taber, of Patterson, N. Y., from the herd of Lord Sondes, at Elmham, Norfolk County, England. The fact that the cattle of this importation are still alive and vigorous, although some have traveled from owner to owner, over a large part of the United States, shows plainly that the Red Polls are easily acclimated, have good constitutions, and are long-lived. Since then larger importations have been made, principally by parties residing in the Northwestern states. These importations and their increase of fine, pure, blooded stock, as shown by the American Red Polled Herd Book, now number a little less than 800 in the United States. There is a constantly increasing demand here for these cattle, far beyond the supply, and but for the high prices in England for the best specimens of the breed, larger importations would be made every year. From a personal acquaintance with many, if not a majority, of the gentlemen engaged in importing and breeding these cattle, I am led to say that they strongly impressed me with the idea that, having become convinced that the Red Polls were a great improvement over any of the well known breeds, they engaged in the business to the end that others might reap the benefits of their energy and enterprise, resulting naturally from the introduction and increase of this breed of cattle among the farmers of the West.

Advantages Over Other Breeds.—My advocacy of the Red Polls is based upon a study and observation of the

breed during several years past. Their points of vantage may be summarized as follows: They are hornless, and it is better to breed the horns off than to saw them off; they are of a beautiful deep red color, with long, silky coats, and soft, mellow skins; they are as remarkable for their uniformity of shape as of color, being fine boned, smooth, and of good size; they are very docile in disposition, of slow, even temperament, quiet, gentle ways, and consequently easily herded and handled; they are a very hardy and thrifty race, born and matured, as they were, in one of the coldest counties of England; subject to almost perpetual cold, they may be expected to thrive well in a climate like ours, and with their hardiness of constitution, supported by good appetites, they are enabled to thrive on scanty pasturage, which would be likely to starve some of the fancy breeds, that must be cuddled and fed often and tenderly, at all seasons of the year. Senator James, of Richland Center, who has started a herd of these cattle, and who is wintering them now for the first time, informed me a few days ago that he has discovered that they require less food than his Shorthorns, take on fat more easily, and are more rugged and constitutionally are better fitted to withstand the rigors of our climate.

Crossing With Other Breeds.—The Red Polls possess a greater advantage in crossing with other breeds, the grades being very superior animals. Their prepotency is such that when crossed with other breeds, the progeny of this cross will be of solid mahogony red color, and hornless, almost without exception, and so like are half bloods to thoroughbreds in appearance, that it is extremely difficult to distinguish them from thoroughbreds.

This uniformity of color in grades, as in pure bloods, is something to be highly appreciated by all admirers of beautiful cattle. The bran-mash color of the Jerseys, and the ring-streaked and speckled color of the Shorthorns, is odious in comparison with the faultless color of the Red Polls. From the time when, as in Numbers, XIX-2, the children of Israel were commanded to bring for an offering "a red heifer, without spot, wherein is no blemish," no color has been more acceptable to the great majority of the people.

I come now to a more particular consideration of the two great essentials, which I claim these cattle possess in a superior degree—beef and milk. The breeders in England, and later, the breeders in America, who have applied the tests, in the development of this combination of quality found in these animals, are unanimous upon the question, and enthusiastically claim that they are equal if not superior, to any breed in existence.

Their Merits as Beef Animals.—As beef cattle, the Red Polls have ever held a high rank in the London market, and the quality of their flesh, in the estimation of the butchers, is considered as unsurpassed. They mature early and fatten easily. The cow, when not giving milk, will make flesh rapidly, and can soon be converted into a prime beef animal. I remember once discussing the merits of the Jerseys with an enthusiast of that breed, and I made the objection that after their best milking days were over they could not be utilized for beef, as there would hardly be enough left to their little carcasses to make a grease spot. But my friend argued, it was no matter—in view of their superior qualities for the dairy, the beef question could be profitably ignored. The Red Polled cow has this advantage over her Jersey sister: She can be

made profitable when age shall have impaired her usefulness for the dairy, by the final results when turned to the use and end of all cattle, which is beef.

The fat steers of this breed are frequent prize winners in England, at the fairs and exhibitions, giving large averages of dead weight, and both live and dead weight comparing favorably with the different breeds bred especially for beef. The claim that this breed furnishes a good beef animal is fully sustained by the record they have made, and seems to be settled beyond dispute by reference to their English history.

Merits as Milk Producers.—Having briefly stated the claims of the Red Polls as good beef animals, I have only to add the general superior merits of the cow as a milk producer, and show that she is well qualified to fill the great and growing demand for the highest superiority in the requirements of a profitable dairy.

The English tests as applied to the Red Polled cow, in refereuce to her dairy qualities, show that for milk and butter she occupies the front rank among the very best cows. These cattle having been in this country but a few years, and there being not to exceed 800 in the United States at the present time, all told, tests have been made to no considerable extent; but the uniform testimony of all who own, or are familiar with any of these cattle, goes to show conclusively that, for continued milking qualities, from calving time to calving time again, the Red Polled stands unexcelled by any breed; peculiar excellence as milkers appearing to consist rather in the uniform quantity and most excellent quality of milk, than in an exorbitant abundance given for a few weeks after calving, followed by a barrenness of as many months, as is the case in some other of the improved breeds. As winter milkers these cows cannot be surpassed. They have good udders, with good sized teats, the latter point being particularly noticeable in comparison with some of the popular breeds.

Opening for a New Breed.—I forbear to occupy your time with a reference to the particular record, made and published, of the quality and quantity of milk given by the Red Polled cow. In considering the merits of this breed of cattle at this time, and in this manner, my purpose is only to call general attention to the subject; to start our cattle breeders out upon inquiry; to encourage them to investigate the matter in their own behalf; to see if this is not a lead for them to follow, likely to result to their benefit and advantage. It seems to me there is a good opening for a new breed, for the infusion of new blood; many of our old breeds are, in my judgment—to use a slang phrase—played out, and especially I think this is true of the Shorthorns.

> They have so long been bred in, and bred out,
> That the breeder is in doubt
> Whether the breed that made the track
> Is going out, or coming back.

I have no doubt that the Red Polls are able to furnish the best foundation for a new start in cattle breeds, whether it be to preserve the breed in its purity, or to cross with any other of our numerous breeds.

In the firm belief that persons investing money in the Red Polls at this time will be purchasing an interest in an industry, that although in its infancy, is destined to be most remunerative, I recommend these new favorites to their esteem.

Their beautiful color, their hornlessness, their adaptation to the more rigorous climate of our Western and Northwestern States, their thick, mossy coats, their splendid appetites, their early fattening qualities, their uniformity in size and appearance, their long-continued

and uniform milk-giving qualities, and above all, the fact that their progeny, although also the produce of other breeds, is identical in appearance with their thoroughbred Red Polled ancestors I believe, places them in advance of other breeds for the dairy, for the butcher, for the shipper, for the general farmer, and for the breeder of fine cattle.

If the facts I have stated in this hurried manner shall induce any number of our farmers, dairymen, and stock-raisers, to investigate the merits of these new candidates for public favor, to aid in solving the question as to their utility and real value to the American farmer, I shall fell myself well repaid for my efforts in the matter.

MERITS OF GALLOWAY CATTLE.

By J. C. KIRKPATRICK, Iowa County, Wis.

Eighth Paper.

Points of the Breed.—The Galloway is a very hardy breed of hornless beef cattle, of black color, and some of them have a brownish tinge. They have neither horns nor knobs; ears moderate in length, standing well up; eyes large and full; neck rather short with fine throat latch; also the neck fills well into the shoulders; head small with a fringe of long curly hair on top of forehead; body round, long and full; breast very full; back and rump straight; ribs deep and well sprung; quarters long and well filled; hip bones moderately broad; hind quarters drop straight down, carrying their size well down to the hock; legs short and stout with fine bone; tail well set on thick, heavy coat of fine curly hair with under coat of soft, mossy hair or fur.

Docile and Hardy.—They are very docile and sensible, which make them very easy to handle. The Galloways have proved to be a very *hardy* breed of cattle, almost as hardy as the buffalo. The origin of the Galloway is lost in the mist of antiquity; no allegation has ever been made in any well-informed quarter that the Galloway is not an original and distinct breed of cattle.

Vitality and Constitution.—Their beef is quoted as prime Scotts, and has topped the English markets, and sold at an advanced price during the past century. The Galloway is considered the most hardy among the British breeds of cattle, with constitution and vitality second to none. They have 25 per cent. more liver and lung than any other improved breed of cattle. Their vital organs being developed in a higher degree accounts for their superior vitality and endurance. In Colorado they selected a Galloway cow to be kept at the observatory on the summit of Pike's Peak, for military purposes, on account of her mellow hide and long silky coat of thick hair, and wonderful lung power which enabled her to stand the cold and light air of that altitude—in fact there are a great many animals that cannot live at such heights, such as dogs, cats and chickens. When spring arrives the Galloways' long hair is quickly shed, giving place to a fine coat that renders them capable of enduring the extreme heat of summer as well as any of the improved breeds.

Breeding Off Horns.—Their impressiveness of freeing their produce from horns is marvelous, in my experience. I

have a Galloway that has sired one hundred and six calves, and not one of them has shown a horn or knob, and all black except two, all being from horned cows of different colored breeds. The Galloway is of good size and is heavier than estimated when cared for properly, and compares favorably with other beef breeds.

Early Maturity and Weights.—As to early maturity and weights, the following showing is taken from the report of the Smithfield, England, Fat Stock Show of 1883: A pure-bred Galloway steer, at two years and nine months, weighed 2,148 lbs.; another two years and seven months old, weighed 1,754 lbs. These are good weights where age is considered. The cows are good milkers, giving good milk, in fact it is of the best quality, rich in butter. The quantity of milk is not so great as that of many milking breeds; there are families that are extra good milkers. The Galloways also raise their calves well.

The Most Profitable.—My father was a farmer and stock-breeder. I was raised on a farm, and now with the experience and observation of fifty long years in raising different breeds of cattle, in Wisconsin, the Galloway has proved to me to be the most profitable.

Adapted for the Range.—In Scotland, where they have been accustomed for centuries to roam over the outlying hills of Galloway, and gather food from the rough grasses that spring up among the rocks and heather, accustomed to be out in all weather, winter and summer, without shelter, only such as the forest afforded them, they have developed a hardy, active habit and a strong, rugged vitality. They are especially adapted for range purposes; for all situations where they have to search for their food, or be exposed to inclement weather.

Beef Qualities.—Their beef is of the best quality, and in the British markets, where it is well known, is eagerly sought after. It is well marbled, the fat laid in thin layers between the muscular tissues, thus furnishing nourishing and palatable meat. The large parts of lean meat are well birdeyed with small specks of fat, making it very juicy and sweet. They also make a large per cent. of lean meat. This rare quality in a beefing breed is most valuable, and one not yet sufficiently appreciated by the stock-raiser.

The Galloways are also valuable for their hides, which are equal to the buffalo's, if not better, for making robes &c., and robes made thus are worth from $15 to $25 apiece when nicely dressed.

A Healty Breed.—The Galloways are a healthy breed, being always free from disease; also hearty feeders, always eating their feed quickly and with a hearty relish. Feed them as well as you will, the day is not too cold for them to roam through the stock-fields, appearing to enjoy the same, and preferring a certain amount of rough feed. They are also very persistent breeders. I have known cows to breed right along up to 20 and 25 years of age.

Beef Packers' Opinion.—In regard to their beefing quality, I will quote the following from Swift & Co., packers, of Cihcago, Ill.:

"This is to certify that our agent, Mr. N. A. Seely, bought and shipped on Dec. 9th 1885, of M. R. Platt, Kansas City, Mo., two Galloway steers. Said steers weighed 4,180 pounds in Kansas City; in Chicago, two days later, 4,150, pounds. Said cattle were killed by us on Dec. 16th and netted as follows: Beef 2,657; dressing 66.40; hide 222; tallow 397, making for the 5 quarters beef, hide and tallow, 3,376 pounds and dressing 81.37 per cent.

"The beef was weighed after being thoroughly cooled. Had it been weighed when dressed would have shrunk about 1 per cent. less. The beef of the

two cattle was of very fine quality, and, everything considered, these were the best cattle that we have killed this year, and shrunk the least of any cattle killed by us this year." E. F. SWIFT.

For Swift & Co. Union Stock Yards. Chicago, Ill., Dec. 20, 1885.

The foregoing speaks for itself, and as it comes from the oldest and largest dressed meat house in America, I think t speaks well for the half-blood Galloway steers. The age of these mentioned steers was 3 years.

In conclusion I would say that I believe that the coming steer of our great cattle industry will be "Polled."

MERITS OF THE GUERNSEYS.

By G. E. GORDON, Koshkonong, Wis.

Ninth Paper.

Purity of Origin.—The best way to get at the merits of the Guernseys will be to look at this breed of cattle from two points of view, that is, to see in what ways they equal well known breeds and in what ways they excel any and all.

Guernseys equal other breeds first in the purity of their origin, second in the agreeableness of their color, third in their admirable shape and fourth in their size.

Their origin on the Island of Guernsey has been clearly defined for about one hundred years. Not only do the laws of the Island forbid the landing of cattle, but these laws have been enforced so thoroughly that the purity of the race is both undoubted and undisputed. When for our own purposes and ends American breeders demanded that the Guernseyman should maintain a herd book; we were met by the unanimous remonstrance that there was no need of a herd book, because all animals on the Island were necessarily pure breed.

Color.—The colors of this breed are agreeable to the eye, and especially to the dairyman's eye; they are most suggestive and indicative of the product. Butter is written large on these cattle. Every point of hide, and hair, and hoof and horn, shines with gold. A herd of Guernseys is a beautiful sight to see, from both the artistic and practical standpoint.

Form and Shape.—In form and shape the Guernseys fitly express the dairy temperament, and the average animal scales high in points. They have level backs to setting on of tail, clean throats, small dewlaps, fine shoulders, broad hips, high pelvic arch, deep bodies, hocks well apart when walking, tails long and thin, fine curved horns, good heads and beautiful faces, large and bright, but gentle eyes, full veins and glands, roomey udders, uniformly large teats, remarkable escutcheons, and are altogether typical and satisfactory.

Good Size.— In size the Guernsey is much larger than the Jersey, approaching the Shorthorn. When crossed upon native cattle they increase the size of the progeny. Used upon any of the large beef breeds the product is a fine animal easily fattened, while, when crossed upon other dairy breeds, greater size and capacity are gained, while the dairy shape is fully maintained and further emphasized. They have been em-

ployed by many of the principal dairymen in England and in this country, to grade up the Jerseys, and are very highly recommended to enrich the flow of the Shorthorns, and to give persistence in milking to the Ayrshires. The Guernseys are precocious, very certain and regular in habits incident to maternity, and produce very healthy and thrifty calves that take right hold of life equally well in all temperatures and climates. In these and many other ways the Guernseys equal any dairy breed.

Excel All Others.—The Guernseys excel all other breeds in the following principal ways, viz.: First, in their extreme docility, combined with a highly developed dairy temperment; second, in their hardiness of constitution; third, in providing their own butter color; fourth, in the persistency of their flow, and fifth, in their yield in total solids and in butter fat. They excel in extreme docility, combined with a highly developed dairy temperament. Their gentleness of disposition is so marked as to invariably call forth the surprised admiration from all upon making their first acquaintance. Yearlings and cows regard men, women and children, and even dogs, without distrust or fear, and the bulls of all ages are kind and tractable. These cattle have been so long tended by the women and children of the island as to make them "domestic" in the fullest sense of the term. Nor is this remarkable gentleness produced at the expense of the dairy temperament. Not even the "nervous" Jerseys can show a higher dairy organization. Their industry in feeding, activity in functional qualities, power of rapid digestion and complete assimilation, with a perfect sympathy for everything that relates to the offices of maternity are fully as marked as in their little cousins, the Jerseys. They make a good showing on the rough grasses which are the native food of the Holsteins, yet respond promptly and fully to the more scientific feeding of the modern American dairyman.

Vitality and Constitution.—Again, the Guernseys excel all other breeds in the hardiness of their constitution. They can rough it and "hustle" like a scrub, but to better purpose, having an unimpaired digestion. They can stand cold if necessary, or heat if so circumstanced. Testimony from Guernsey herds in Georgia and the Carolinas, on the Atlantic seaboard, on the Pacific coast, or in the cold Northwest, is unanimously in favor of the hardiness of this race. Some of the most celebrated Guernseys inhabit the bleak, Berkshire hills, and others are coddled in warm farms in temperate climates. But, perhaps, no breed will pay so well for sensible care and judicious painstaking. The breed is free from disease, and especially from tubercular disease, and they seem to thrive upon all soils.

Winter Dairying.—They can be especially recommended to those who keep a winter dairy, as we know of instances in which the returns have been enormous during the colder period of the year. The Guernseys stand alone and singular in their ability to richly color butter at all times of the year. Even in the late winter they make "June" butter. This quality is so unusual and so marked that in new neighborhoods the pure, "uncolored" butter of the Guernsey has been often rejected from dairy exhibitions on accouut of the richness of its color, ignorant judges affirming that such natural coloring was impossible. But those who know the Guernseys are familiar with this yellow pigment which is inherent in the animal, not dependent upon feeds, and which suffuses the skin and shines from every

part of the body. A Guernsey bull used in grading conveys this ability to the herd he produces, and one Guernsey cow will color the butter of many natives.

Large Producers.—These cattle are unsurpassed in the persistency of their yield. They are not so much celebrated for their flush as for the steady continuance of the flow of milk. They are very hard to dry off and continue milking to a great age. But most of all, the Guernseys excel in their yield of butter.

The Consular Report of 1887 says: "The cows of Guernsey are celebrated for yielding more butter than even the Jerseys." The Agricultural College at Guelp, Ont., says: "The Guernsey yields thirty per cent. more butter than the average standard of other breeds." Prof. E. T. Gill declares that the Guernseys surpass the Jerseys in richness.

Rich in Solids.—Mr. Tesdale has shown that the Guernsey is richer in solids and in fats in the following proportions, viz.: Being one hundred per cent. richer than the Holsteins, twenty-two per cent. richer than the Shorthorns, and about one per cent. richer than the Jerseys. Five years' test of the British Dairy Farmers' Association gives the following results in favor of the Guernseys:

	Per Cent. Butter Fat.	Total Solids.
Guernseys	4.80	14.09
Jerseys	4.26	13.06
Shorthorns	3.79	12.07
Holsteins	2.97	11.08

Of milk analized in 1880 at the Pennsylvania State Fair, the Guernseys excelled the Jerseys nearly ten per cent. in butter fat, the Ayrshires thirteen per cent., and the Holsteins fifty per cent.

Satisfactory Results.—Very much more might be quoted from many sources, showing the wonderful capacities of these cattle. After many years' experience with three principal breeds, including a representative herd of Jerseys, it is the belief of the writer that the utterance of Mr. Wyatt, of England will be true if applied to this country also: "No one I have met, who has given it a trial, has ever abandoned the Guernsey for another breed. I have known of long-established herds of Jerseys to be crossed with the Guernsey to increase the size of the progeny and also of the milk yeld, but I never heard of grading Guernseys with a Jersey."

Conclusion.—In conclusion it may be said that great as have been the benefits to American dairymen in the introduction of the higher classes of cattle, yet the advent of the Guernsey will mark an epoch from which very much of the future prosperity of those who are seeking the best material and the best methods will be dated. The only pity is that the Island of Guernsey is a small place and the number of its cattle few.

THE RAISING OF CALVES.

By Prof. J. W. ROBERTSON, Ontario Agricultural College, Guelph.

Tenth Paper.

Bloodand Breed.—"Blood and breed" stand for qualities which are of much service to the stock-raiser. A good steam boiler and engine, adapted by construction to the work to be done, are valuable to the progressive grain thresher. What fuel and oil are to the machinery of the latter, feed and care are to the animals of the farmer. An intelligent thresher with good fuel and skill will get more work out of an inferior boiler and second-rate engine, than a shiftless, careless engineer will get out of the best machinery. I think the same principle applies to every department of farm work, and so I say that the "heredity" and "individualty" of the farmer have more to do with the successful raising of profitable milking cows for his dairy, or steers for his stalls, than the "pedigree" of his herd. As a rule there is no profit in trying to raise late calves, that is, calves dropped as late as May. It pays better from both the dairyman's and stockraiser's standpoints, to have most of the cows begin their milking season between October and February.

Selection of Calves.—In any case the calves from the best milking cows only, should be selected for rearing. The herd bull should have a pedigree linking him to a family distinguished for milking qualities. His points should indicate the possession of powers that do credit to his pedigree. If a calf with a big body at one, two, three or six months old be what is wanted, it had better be allowed to suck its dam. But if a calf having a large profit on its rearing at two years old, and a large profit on its milking, or fattening, be the object sought for, then it should be reared another way. Where a calf is allowed to suck the cow, even for a few days, the cow is in a less contented condition of nerve to yield her milk to the hand for some weeks. The restlessness thus caused will tend to the lessening of the milk yield in most cases. The task of teaching the calf to drink is doubly difficult after it has acquired the habit of getting its supper in the natural way. Invariably where a calf has been permitted to run with its mother for ten days, I have found it go back, or at least fail to gain in condition for a fortnight or more, when a change was made to hand feeding. The checking of its growth and thrift at that early stage in its development, entails more loss of possible profit in after years than a partial winter's starvation when eighteen months old. The organs of digestion, whose functions it is to get for the animal all possible good out of its food, for maintenance, growth, beef, milk or work can never be injured with impunity. The treatment from the day of birth should be to preserve, and if possible, to improve the assimilating power.

The First Milkings.—Milk from the first six milkings of the dam should be fed to her calf three times a day. The first milk, "colostrum" or "beastings" is of medicinal as well as food value to the young calf. For two weeks the calf will not need, nor take much besides the two or three quarts of whole milk of each feed. The milk should be fed as near the blood temperature, 98° Fahrenheit, as practicable. After the lapse of a fortnight a gradual change, during the third week, may be made from whole milk to sweet skim milk. Such a change can be best effected by putting skim milk, in gradually increasing quantity, with the whole milk till it is wholly substituted for it.

Sweet Milk.—The skim milk should always be fed *sweet*. The sourness of milk is evidence that some of the feeding value of its sugar of milk (of which it contains say 4½ per cent.) has been lost by the change into lactic acid. Besides the sourness renders the food unsuited to the stomach of a yet tender calf. Sour feed in such a case favors growth in but two ways. The calf so fed will develop marvelous girth extension. "Pot-bellied" is hardly sufficiently expressive of the chronic enlargement from that cause. Then the growth of hair is effectually and speedily promoted. It becomes so strong in "stalk" that it stands out in daily protestations against that kind of food.

Warm Milk.—The skim milk should also be fed *warm;* the blood heat is the best. Where no better convenience exists for the heating of the milk, hot water may be added with advantage. A feed of ice-cold milk, such as comes from the deep setting cans—(by the use of which fine dairy butter can be most economically made)—will leave the calf uncomfortable. That condition is but the evidence that indigestion exists and may easily be made partially permanent by a continuation of such injurious treatment. The power and practice of digesting and appropiating all that is possible out of its feed should be encouraged into a fixed habit, by giving the young animal only easily digested feed in the best condition of preparation.

Regularity.—Attention to strict regularity in the time of feeding and the quantity of milk given is essential to health and safety as well as to profitable increase of weight. These points about the feeding of skim milk will apply to young pigs as well as calves. A gutty, thriftless hog is the necessary product of a careless and wasteful mode of feeding even excellent skim milk.

The Ration.—To make up for the butter taken out of the milk in the shape of cream, some supplementary feed should be given with the skim milk. Linseed, oil-cake, cotton-seed meal, bran, oats and peas are all good. Bran is frequently mixed with chopped oats and peas, and fed raw *in the milk*. That practice is most objectionable, and frequently results in the loss of the full value of the grain fed, besides inflicting injury upon the calf by scouring. The better plan is to put the bran, and chopped oats and peas, with ground linseed in a dry state into a box conveniently placed within the reach of the calf. Between the ages of one and three weeks most calves will begin to eat the mixture. The chewing necessary to comfortable swallowing fits the feed for proper digestion and prevents all risk of scouring from that cause. The chewing also favors the free flow in the mouth of a good deal of saliva needed to thoroughly digest the milk gulped down so hurriedly from the feeding pail. Linseed, oil-cake, or cotton-seed meal may be boiled or well scalded and mixed in a syrupy state with the milk. The com-

position of the additional feed might be about equal parts by bulk of bran, oats and peas. No fixed quantity per head for feeding need be mentioned. It has been found desirable to allow the calves to take as much as they care to eat. Handfuls of the best clover hay—and all hay for fodder should be cut on the green side—may be offered, and most calves will eat with relish at a month old. As soon as grass can be got it should be given in liberal quantities after calves are three months old.

Stabling.—Opinions differ as to the relative advantage of keeping calves in the stable all summer and allowing them the run of a small pasture field. A grass plat with no shade from the sun and where flies are numerous and diligent, is not the best place for calves. But if the calves be kept in a dark, cool stable during the hot days of "fly time," and turned out for the evenings and nights, the protection of the soiling system will be coupled with the benefit of exercise and feed out-side. Some farmers report very satisfactory results from adding turnips or small potatoes, pulped, to the aforementioned grain mixture, from the time the calves are three weeks old. No matter where fed, in the stable or out, each calf should receive only its own allowance of milk, and that regularly. The distention of the stomach by over-feeding is very harmful. The old-fashioned implements for the feeding of six calves in the field, being but three buckets, or one trough and one big stick, had better be exchanged for more sensible and economical conveniences. Outside feeding from a trough is unsatisfactory, as the big and greedy calves get more than their share, while the weaker ones get barely enough. The construction of small stalls for the calves against a fence in the plat will make it easy to give every calf its own share, in its own pail, in its own stall, thus successfully avoiding the respective risks of gorging and starving.

Satisfactory Results.—Calves reared in this way will gain in size and strength of constitution all spring, summer and autumn. When the severe weather of late fall and winter comes, it finds these calves accustomed to live mainly on grass and dry chop feed, so that the change to stable and winter conditions of existence is not violent nor very trying. The best conditions for profitable growth having been supplied by the intelligence of the owner, the inherited good qualities of any calf will get fair play. But if good qualities of breed inherited from the best of stock be balked at the beginning by unsuitable conditions for growth and thrift, all chance of after profit from milking or fattening is gone. The profits of dairymen can be largely augmented by proper attention to the early feeding of early calves.

EVENING SESSION—MARCH 28.

WHY ADAM LEFT THE FARM.

By Mrs. V. R. C. BARLOW, St. Croix County, Wis.

First Paper.

A Historic Question.—The question is historic, but its classic importance would hardly justify taking up the valuable time of this institute if there were not still living in Wisconsin so many of the Adamses, who, like their illustrious ancestor, are soon to leave the farm, or the farm to leave them. To a multitude of anxious fathers seeking places for promising and unpromising sons, it is a most practical question.

A Question of Dollars and Cents.—It is a question comprehensive of dollars and cents, of blood and bone and sinew, of nerve and brain. It leads to a direct acquaintance with the verbs of knowing, willing and daring, of being, doing and enduring.

A Successful Farmer.—An altogether satisfied and successful farmer, in the year of grace, 1888, is a remarkable creature. He is poet, philosopher, politician, architect, engineer, financier, attorney-general, steam engine, telegraph dispatcher, Job, Solomon, Samson, Argus and General Grant, all rolled into a unit.

Spend a Year on the Farm.—Every boy, to complete his education, ought to spend a year or two on a farm. What will he learn? The supplement of every thing that the schools and colleges teach, common sense included. He will discover the value of time and place. He will become acquainted with material things, with quantities and qualities, the properties of length, breadth and thickness, of strength and weakness, of hard and soft, of heat and cold, of coarse and fine, and not in the abstract either. He will learn to use his eyes and his hands. He will find out something about order and confusion, cleanliness and dirt, impudence and independence, good and bad manners, and what relation they sustain to "getting on in the world."

The Farmer Creates.—"In the division of labors," says Emerson, "it is the part of the farmer gloriously to create." The farmer stands closest to nature. From her raw materials, and often noxious elements, he has provided food and raiment for all the generations of men.

All trade and progress rest on his activity and intelligence.

From the hand of nature, what was old Egypt? — a barren, drifting waste of sand cut in two by a huge stream of black mud, too filthy to drink or to bathe in; fit only for rats and crocodiles. By multiform contrivances and ceaseless industry, the husbandmen of three thousand years ago achieved dominion over it. Reservoirs, canals, ditches innumerable and myriads of water-wheels perpetually pumping converted it into a harbinger of health, cleanliness and fertility. Ever since, in spite of the bad government under the Pharaohs, the Persians, the Ptolemies, the Romans and the Turks, it has been "the land of plenty." Should we ever have heard of Egypt, had the modern theories of free trade been in vogue there? Suppose the leaders of the people and the economists had said to those old freeholders: "Don't attempt to force capital into artificial channels! It will not pay to try to bring under cultivation your sterile fields. It will be cheaper to buy your corn in foreign markets. Your competitors, the Arabs, the Numidians, the Syrians and the Carthagenians, are all eager to sell to you." If one of the patriarchs had raised the question how they should get the wherewithall to buy with, the old fogy would have been told that that was a side issue of no importance—must take care of itself.

Skilled Labor in Holland.— Look at Holland, once a marshy bog, below the level of the sea. What did skilled labor do for her agriculture? The most unpromising soil, by miles of coast fortification and artificial drainage was converted into the fattest meadows of modern times, into pastures teeming with the finest flocks and herds, into the most productive farms, nurses of populous and opulent cities and villages. The seventeenth century saw Holland not only a blossoming garden, but one of the greatest maritime and commercial powers, under the most liberal and enlightened government of the age. The tillers of the land reclaimed from the sea, were the bulwark of the reformation. Agricultural Holland furnished the brawn which upheld England's civil liberty. To the Puritans she gave an asylum until they set sail for America. From farming Holland came the founders of the Empire State. They planted there the thrift, sturdiness and economy which made Holland and placed New York where she is — first in the Union. To-day there is not a citizen in these free United States but is debtor to the so-called unscientific and misdirected industry of the Dutch grangers. Human beings surrounded in youth by conditions similar to those in Eden, where papa stands for the vine affording free lodgings, and mamma for the fig tree providing ready-made clothing, are not apt to develop thinking powers of sufficient vigor to discover much dignity in labor.

An Important Problem.—After the expulsion from Paradise, the first problem that confronted Adam was the same that the gilded youth of to-day are vainly trying to solve—how to get a living and at the same time evade the primeval curse—work. The tradition generally accepted is that Adam chose farming under the delusion—which still prevails —that soul and body may be kept together with less effort in that business than in any other. Herein was Adam's first great mistake. Had he turned his attention to law, he could have gotten into criminal practice at once. Had he became an M. D. and kept clear of poultry shows, there was not one in a thousand leagues to cry quack! Had he gone into politics he could have pulled

the wires so as to be elected unanimously to the first office in the realm. But, haunted by rose-tinted memories of the peace and plenty, the beauty and luxuriousness of Eden, doubtless, he idealized all the pursuits of rural life. Its charms he knew, its drawbacks he had yet to learn.

Breaking Wild Land.— It does not take long to find out that there are easier things than breaking wild land. It is work that soils boots and hardens hands. He discovered that garments redolent of the stable had an ill perfume, and that worn plow horses made dull roadsters. Then a brilliant idea occurred to Adam. He would get a hired man! And straightway he hired a nomad that chanced to be tramping that way. But, he turned out ignorant and lazy, more anxious to fill his stomach and get the money for a new blanket suit before cold weather came than to do good work. Thus in his youth did Adam experience the truth of the great American philosopher's proverb: "He who by the plow would thrive must either hold or drive."

Unclean Seed.— It is hard to understand how Adam, having new land, fresh from the hands of the Creator, could have been so careless as to let it get fouled up with all manner of unclean seed. Because, among the flora of that locality, Adam had to contend with burdock and mullein, was that any reason he should naturalize Canada thistles? If, in the settling up of the country, ragweed did spring up by the roadside, was that any reason he should let it go to seed and choke up the fair fields far and near?

Extenuating Circumstances.— However, there are extenuating circumstances to be taken into consideration for Adam's ignorance. He lived at a time when the science of agriculture was in its infancy. He had not even the privilege of gleaning the wheat from the chaff in an agricultural journal. Before a farmers' institute could have shed its beneficent light on the questions that vexed his soul, he would have been an old man — a six-thousand-year-old-man.

Cain and Abel.— Doubtless Adam let his unmentioned sons, those destined for trade and the professions, go to school, but he kept the elder ones, poor little Cain and Abel, at home to do the chores — to milk the cows, tend the calves, fold the sheep, feed the pigs and chickens, water the horses and rub them down, clean the stables, cut the wood and bring it in, hoe the corn and cabbage, weed the carrots and onions, dig the potatoes, and do the thousand and one other odd jobs that parents are wont to delegate to their restless, growing, untrained, fun-loving boys, and then grumble because they are not all well and promptly done. Probably Adam never heard that example is a better teacher than precept. Was it any wonder, then, when the boys saw the old man so eager to get away from work, that they sometimes tried it.

Practical Education Wanted.— Perhaps Adam did not blame his boys when the cows suddenly dried up and the garden stuff got lost in a thicket of weeds, and the horses unaccountably went lame, and the pigs kept him awake o' nights, squealing for supper; but, had he lived in the latter half of the 19th century, I very much fear he would. If our forefathers had only appreciated that all their sons had equal rights to a broad, practical education,—mind and hearts

> "Trained for either field or court,
> Skilled in every manly art,
> Ready, enterprising, smart,"

the farmer boys never would have de-

generated into a race of hide-bound men prejudiced, obstinate, narrow, suspicious of new methods, slow to heed instruction, blind to their own interests.

From Bad to Worse.—It is easy to trace how things went from bad to worse on the Adam's farm. After a time Adam had to compete with farmers farther west, where the soil was still in its native fertility, and so cheap that the first crop often paid for the land. His once rich fields sown year after year with grain until they yielded only half a crop, and that shrunken by drouth or chinch-bugs, foul, too, with chess and wild oats. I can see the filthy pig-pens breeding disease. I can see forks and shovels thrown down where ever last used; the barn all out of order, dust sifting down from beams and poles over head, shingles flying in the wind, doors off hinges; the stable floor full of holes; the feed-boxes musty from the sour feed packed in cracks and corners. I can see the bony horses in the rusty harnesses, and hear the creaking old lumber wagon. I can see the poor children unkempt, ignorant, ill-mannered, dirty, snapping and snarling at one another. Was it any wonder that Cain killed Abel? Was it any wonder that Adam wanted to emigrate—to leave that old farm.

Farms That Do Not Pay.—Alas, that farm was the archetype of too many in Wisconsin. They don't pay for the labor hired, the interest on the money invested, the taxes and insurance. Shall the farmer emigrate? A farmer successful in the valley of the Euphrates will succeed anywhere. When unsuccessful there, on account of short-comings in judgment, in integrity, in business capacity, in good management, will for the same reasons, fail in Wisconsin.

Emigrating Farmers.—Those farmers who have been emigrating all their lives—from New England to New York, from New York to Ohio from Ohio to Wisconsin, to Florida, California, Dakota, Washington Territory, and back again to Wisconsin—unsuccessful men everywhere, leading always, hard, up-hill lives—verifying the old saying, "the rolling-stone gathers no moss."

Extravagance, Ignorance.—I have yet to learn of a case where moving has cured the misfortunes arising from extravagence, shiftlessness and ignorance. Grit, good-sense, "get-up and get" are as assential to permanent success in the far west, as elsewhere. He who owns a fair farm in Wisconsin, with her healthful climate, pure water, good markets, good schools, and good citizens, runs a big risk when he breaks up a comfortable home to begin again in a new country for the uncertain chance of making a little more money. Let those, who, like Adam, think of leaving the old farm, because they don't make a "bare living" off it, ask themselves where the trouble lies—in the farms or themselves Are they really farmers? Have they not been, running the farm just as a man, not a machinist, can open and shut the valve of an engine, but helpless if any thing throws it out of gear?

A Hap-hazard System.—The time has come in this country when a hap-hazard, dont-know system of husbandry means *leaving the farm.* The man who knows no more of husbandry than to press all the fertility out of the soil, letting it become more and more worthless every year, deserves to be classed with antediluvian Adam.

Respect Your Calling.—The first thing for men to do is to respect their calling, to believe in it, to honor it. Then, and then only, will it honor them. I am filled with shame and indignation when I hear farmers excusing themselves for being nobodys, shirking re-

sponsibilities and neglecting privileges because they are "only farmers." Let them say rather: "Because we are farmers, engaged in a calling so independent and honorable, a business upon which the material, social and political welfare of this nation depends more than upon all others, we owe it to ourselves, to our friends and to our country, to make the utmost possible of ourselves, to make the best of our opportunities, and to fill to the full the place Divine Providence has assigned us."

AGRICULTURAL EDUCATION.

By Prof. W. A. HENRY, Director of Wisconsin Experimental Station.

Second Paper.

Agricultural Colleges.—On December 14, 1857, Mr. Morrill, of Maine, introduced into the House of Representatives, a bill authorizing the establishment of an Agricultural College in each state in the Union, granting for the maintenance thereof, a body of land amounting to twenty thousand acres for each member of Congress the several states had at that time. This bill was reported back unfavorably by the committee on public lands. In 1858-9 the bill passed both houses by small majorities, but was vetoed by President Buchanan. A similar bill was introduced in the Senate by Mr. Wade, May 5, 1862, while Mr. Morrill, the author of the original bill, introduced another similar bill into the House about the same time. The greatest difference between the bill of 1862 and the one vetoed by President Buchanan was that the later bill gives each state thirty thousand acres for each Representative in Congress where the former bill gave only twenty thousand acres, and that the later bill adds military tactics. It is certainly remarkable that when this government was in the throes of a great civil war, Congress should stop and give attention to educational questions as they did. President Buchanan vetoed the bill probably from lack of sympathy with the industrial classes, while Abraham Lincoln, ever mindful of his humble origin and the great wants of the common people, signed the bill July 2, 1862.

Land Grants.—Whoever reads the discussions on these bills as they took place in both Houses of Congress must be deeply impressed with the sentiment ever present, that in this grand donation the needs of the farmer were uppermost. Mr. Morrill in his speech called the attention of Congress to the fact that the profession of war was provided for by the government in its great college of training at West Point. He spoke of the immense grants of land for general education while nothing had been done directly for agriculture. He adverted to the decreasing yield of crops per acre owing to lack of proper knowledge and good judgment in farming. He suggests that these schools could make experiments on the capabilities of soils; the effects of fertilizers and value of different grasses for flesh, milk and fat; the comparative

value of roots, grain, and hay for wintering stock; kinds of grain used for stock; deep plowing, drainage, vitality and deterioration of seeds, breeds of cattle and kindred subjects. He spoke of the numerous agricultural schools of Europe and the single one of the same nature already established by Michigan, and believed they "would turn out men for solid use and not droning." No where in these speeches do we find any other thought more common than that they were laying the financial foundations for Agricultural Schools—schools in which young men should be prepared for the profession or calling of farming. Some members opposed the bill on constitutional grounds though admitting that there was need of such education. Said Senator Howe, of Wisconsin, who opposed the bill on constitutional grounds: "The purpose of founding all Agricultural Schools I am as much in favor of as anybody." Senator Harlan said: "This body is a body of lawyers, there are very few gentlemen here who are not professional lawyers. Heretofore, appropriations of land have been made for state universities. The proceeds of the sales of these lands have usually gone to educate the children of professional men who are able to defray the expense of the education of their children away from home in classical studies and learned professions. Here for the first time I believe in the history of the Senate a proposition is made to make an appropriation of lands for the education of the children of the agriculturists of the Nation and it meets with strenuous opposition from a body of lawyers." I say without fear of denial that no one can get at the spirit of the land grant of 1862, as it shines forth in the speeches in Congress, without being deeply impressed with the idea that the movers of the measure were endeavoring to found agricultural colleges in the true sense of that word.

How the Grants Were Used.—The grants were made, but the civil war continuing so engrossed the attention of our people that in most instances it was several years before the States availed themselves of the benefaction. When the legislatures of the different States took the measure in hand, the farming interests as a rule were poorly represented or rather they were indifferent to the matter and no definite plans seemed to have prevailed in their behalf in any of the States. Many of the States gave the money to existing colleges or universities, our own State being one of the number. A few, only, as Michigan, Maine, Iowa and Kansas turned the donation over to bona fide Agricultural Colleges. All of the schools, as soon as educational operations began, made an effort to secure agricultural students. In the several colleges and universities, professors of agriculture were appointed and a course established and advertised, but few students appeared for instructions, excepting in two or three of the schools. Finding their first efforts a failure for the most part the colleges threw the blame for non-attendance, back upon the farmers, and gradually drifted toward general advanced education. That the farmers were indifferent and careless at this time to the state of affairs there can be no denial. If my memory serves me right, forty-five farmers in the Wisconsin Legislature voted to give the land grant to the State University and no opposition of serious weight was raised against the proposition by them. The proof that there was no direct interest taken by them in the matter is shown by the lack of discussion upon the subject in the agricultural press, and the reports of agricultural meetings. Within recent times, how-

ever, there has been a general awakening, and a great deal of scolding and fault-finding has been done, and efforts made to bring about a state of affairs which should have existed from the beginning. After a careful study of the matter, it seems to me that the blame rests with both university and college authorities, for not making a more strenuous effort in the direction of agriculture as they were bound to do in accepting the gift, and with the farmers for their indifference in the matter, in the beginning and years after.

Failure of the Land Grant.—But the past is the dead past to us, and only out of the future can come anything of advantage to us, and we must look ahead to see what there is of value for us, as an outgrowth of the grand gift of 1862. That our own university at Madison for years was without agricultural students and did little for agriculture is a fact, but that when the farmers awaked to their needs and demanded recognition from the university they received it, is equally true. Whatever may have been the shortcomings of the Board of Regents of our university I can say with all honesty and sincerity that since my coming to the department of agriculture they have shown an earnest and eager desire to foster and enlarge its activity in all directions, that gave promise of good to our people. I fully believe that the great failure of the land grant of 1862, to accomplish the good prophesied for it by members of Congress in their speeches, came from a total inability of our people to make use of a gift prematurely given and received before the grantees knew how to properly handle it. If the University of Wisconsin failed to properly use the agriculture and land grant fund, I believe it was not because of hostility by them, but a lack of knowledge of how to use the money and an indifference of our farmers in helping them in the matter.

The Short Course.—But again to the future. Three years ago it was concluded by the Regents that a short course in agriculture should be offered to our farmers' sons in the hope that if they would not pursue what was styled our long course in agriculture they would come to us for at least a winter. In this short course we were directed by the Regents to introduce what I may style the intensely practical side of agriculture and to leave out theories and general training except where necessary to proper instruction. While other States had offered a winter course of this kind, which generally proved failures, Wisconsin took the lead in spending money freely upon the course and making all of the teaching in this course applicable to it in all its arrangements and details. In the other Colleges, students who came for a short time only were compelled to fit themselves into classes already established and to listen to lectures given to general students; with us the instruction was to be for the class and it only. In this, which may be called the new method of teaching agriculture, Wisconsin took the lead and has set an example that some other States are already endeavoring to follow. The first winter we had nineteen students in this short course; in the second, twenty-six; and the third (the present) twenty-five. Nearly all of our students were farmers' sons who left the farm to come to the University and who left the University at the close of the course to return to the farm. As I address you this evening, there sits scattered among you eighteen of these young men who have remained over from the short course class since last Friday when the term closed until this time for the purpose of attending this Farmers' In-

stitute. These young men are farmers, heart and soul, and I assure you it has been a pleasure for us to give them instruction, and if I may judge from expressions uttered by them, they in turn are delighted with what they have received. The instruction they have received has been as follows: A daily lecture, or talk I should call it rather, by Dr. Babcock upon chemistry relating to agriculture, daily instruction by Prof. Barnes in "how plants are built up, live and grow," a daily lecture by myself upon stock feeding, breeding, drainage, &c. while twice a week Dr. Atkinson, the State Veterinarian, has been with us teaching the structure of the horse and other domestic animals, and the best methods of preventing disease and curing it. That this course has cost the University a considerable sum of money I need not tell you. The Auzoux model of a horse which Dr. Atkinson will show you in this room during the institute alone cost us over $800, which will give, you an idea of how the expenses count up. Let me say that not once have I heard the expenses of the course questioned by the Regents; the first question is not "what will it cost?" but "can we get more students, thereby."

Mechanical Training.—I have failed to mention the mechanical training so skilfully given by Prof. King, of the University machine shop. Every boy that came to take the course thought he knew how to saw a board in two, and his chagrin was great when he found himself unable to do so simple a thing properly. How they have advanced in wood turning, iron work and wood work is shown in a small measure by the samples of their handiwork on exhibition in an adjoining room. You will see that our farmer boys can do pretty good blacksmithing, and can make joints, do planing, sawing and turning in a way that would make an ordinary boy green with envy. I urge upon our farmers present to give us their cordial encouragement at this time; we want your boys at the university to take either the long or short term in agriculture, and are prepared to give them better instructions in the future than in the past. Next year our corps of teachers will be enlarged, our building improved and our facilties amplified. Send us the young men and we will help them more than you suppose we possibly can. I say this with confidence, for three classes have now gone out who have had such instruction as we can afford, and I know that our work will be far better in the future than in the past. Do not find fault with us for not having students when we are spending money freely to provide instruction. A merchant cannot sell goods no matter how loaded his shelves may be, if customers will not come to purchase.

Short Course Students Respected.—One more point and I am through. I have asked the young men as they were leaving us, if they had been mistreated by other University students because they were pursuing agricultural studies, and can learn of no wrong acts from others in the University for this reason. One farmer told me he was afraid to send his boy to Madison, because the other students would make fun of him. I told him in reply that in no other place would his boy be freer from the jeers and taunts of others than in our State University, if he carefully attended to his own affairs. We have the most complete democracy on earth, and only dudes and "smart" young men who "talk too much" need fear being molested. If your boy comes to the University with the expectation of surprising fifty professors and six hundred students there assembled, by

his wonderful erudition and extensive knowledge, I do not care whether he matriculates as a law student, a pharmacy student, a civil engineer, ancient classical or agricultural, he will soon find himself in trouble, not because of the course he belongs to, but because he is entirely too smart to live with, and must be put down.

The young men that have come to us have, with very few exceptions, been in dead earnest about their business, and have attended to their work faithfully, and have commanded the respect of teachers and fellow pupils. Our University affords excellent opportunities for a farmer's boy; here he meets with all classes of young men having all sorts of ideas and ambitions, and is greatly benefited by such contact, for his ideas are broadened and the clannish spirit melted out of him.

Success of the Short Course.— When our short course was started, I was very doubtful of its success; now I have a firm belief that we are on the road to better things than the sanguine ones thought possible, we must not take a backward step, but go forward; send us the boys and we will lengthen and strengthen the course, spending money and energy gladly and freely; again, I say, send us the young men, and my word for it, neither you nor they will regret it.

Now, I say that our agricultural course is a success. I believe, within three or four years, it will be a grand success to the young farmers of the State, if the farmers will do their duty. I want you to help us advertise this course. We want everybody to know of it and be talking about it. If you will do that, call the attention of the young men in your neighborhood to it, we will get them into the University, and when we get them there I will guarantee we will take care of them.

Discussion.

MR. BENTON — What does this short course cost aside from board?

PROF. HENRY—The boy will buy about $12 worth of books on agriculture and familiar science, which he takes home with him; he will pay the University $4 for incidental fees, that makes $16, and that is all the expense I can name aside from his board and incidental expenses. His board will cost him about $2.50 a week, if he boards at the club, and his room will cost him $1.00 or $1.25. Seventy-five dollars will cover the expenses of a reasonably prudent young man for the twelve weeks, from the time he steps off the cars in Madison until he takes the cars to go home.

MR. URQUHART — I have heard about this short course that has been talked about in the State, and must confess that I did not have much faith in it, but seeing is believing, and what I have seen to-day has convinced me that it is useful and extremely practical. I see some work in that room where the exhibit of mechanical student work is, that would make some of our mechanics who call themselves mechanics, blush to see, and they tell me it was all done by these students. There seems to be a great objection among farmers' boys when they leave the farm to going back again, but these agricultural colleges seem to correct that feeling. In Ontario, where they make a business of sending children to the agricultural college, they find that over 85 per cent. of them go back to the farm again.

FARM RESIDUES.

By Prof. MANLY MILES, Lansing, Mich.

Third Paper.

An Age of Progress.—This is an age of industrial progress. The invention, of machinery, improvements in the steam engine, and systematic organization, with large accumulations of capital, have revolutionized our means of production and transportation, and brought the most remote regions of the globe into the most intimate relations of common interest.

This progress, in the logic of events, has led to a complete reorganization of methods of production in manufactures of all kinds, and the most intense competition has reduced the margin of profits to a point that is fatal to all establishments that are not on a sufficient scale to make the sum of small items of profit an aggregate worth seeking.

Let us briefly consider some of the conditions under which the world's work is performed in the industrial arts. Large investments of capital are needed, and specialization and intensity in production must be supplemented by an intelligent subdivision of labor with strict economy in its applications. An unskilled workman with a machine takes the place of the skilled handicraftsman, and the rapid exchange of commodities is an essential condition of success.

Even with these aids to cheap production, manufactures in many cases have only succeeded by utilizing residues which had before been wasted. The applications of science widened the available resources of production, and the residues in many instances became the dominant interest of the industry on the score of profit.

Low Prices.—Agriculture is fortunately exempt from many of the conditions that diminish the margin of profits in other industries. Facilities in transportation which bring in competition the products of cheap and fertile soils, and cheap labor, are the leading factors in determining the low prices of farm products which now prevail.

This competition cannot be evaded, and the farmer has no reasonable hope that former high prices will again be realized. It must be met by an application of the same general business principles which command success in other industries.

From the very nature of the conditions involved, specialization, and intensive systems of production, and the subdivision of labor which are essential to success in other arts, cannot be applied in farming. The intimate relations of the different interests of the farm are not recognized in special farming, and high farming cannot be looked upon as a remedy for prevailing low prices. Under an intensive system of farming, every increase in the product, beyond a certain limit which varies with each farm, involves an increased cost of production.

The only remedy for the prevailing low prices of the farm products, that can be safely recommended, is the practice of a thorough and consistent system of farm management which provides for

making the most of every resource, and this involves an economical administration in the expenditure of labor and the utilization of all farm residues, so that all wastes may be avoided.

Hand and Brain.—Every aid that science can render must be brought to bear on the problems presented in every department of the farm. The relations of chemistry to agriculture are so well understood that they need only be referred to here.

In physics the law of the conservation of energy has revolutionized its methods of investigation, and as the farmer is constantly dealing with energy in its various forms and modes of action, he, too, is interested in the applications of this general law of nature.

The comparatively new science of biology has to do with life in its various manifestations under a wide range of conditions. As the farmer is constantly dealing with living organisms, from the crops which he grows, with the world of vital forms which influence them for good or ill, to the animals which he cares for, with the numberless parasites which assail them, he must be interested in the laws of vital activities which supersede or modify the ordinary physical and chemical forces with which he is familiar.

Every department of science has, in fact, relations more or less direct, to every subdivision or interest of the ordinary routine of farm practice. It may safely be asserted that there is no business or profession in which so wide a range of knowledge may be profitably made use of as in farming.

Science and Agriculture. — The relations of science to agriculture must not, however, be overrated or misconstrued. Agriculture is the oldest art, and its practical principles have been well established by long experience. Science cannot be reasonably expected to essentially modify or supersede them. Its mission is to explain the results of practice and suggest new lines of experimental investigation that will add to the value of our experience, and lead to improved methods of management, with greater uniformity and certainty in the results obtained.

Barnyard Manure. — Among the residues of the farm, barnyard manure may first claim our attention from its paramount importance in a system of mixed husbandry.

In discussing the subject of manures to a popular audience it will be best, on the start, to make a concise statement of some of the leading facts in the nutrition of plants and animals, and their correlated relations.

Of the 70 or more elements known to chemistry, only 13 enter into the composition of plants and animals. Four of these, viz., carbon, oxygen, hydrogen, and nitrogen, with a little sulphur, form protoplasm, "the physical basis of life," and an essential constituent of every living cell, and they are also of particular interest as making up a large proportion of the dry substance of plants and animals. From 8 to 31 per cent. of plants, and from 35 to 65 per cent. of animals, may be reckoned as dry substance, the rest being water. Of this dry substance, nearly one-half is carbon, and next to this in amount is oxygen, with a small percentage of hydrogen, and from 2½ to 3 per cent. of nitrogen.

When the plant or animal is burned, from 1½ to 7 per cent. of the dry substance remains as ash. Eight of the original 13 elements are found in the ash, and among them are potash and phosphoric acid.

The natural supplies of ten of the thirteen elements which enter into the composition of plants are abundant under

all ordinary conditions, but the other three, nitrogen, potash and phosphoric acid, are often deficient in the soil, and they need, therefore, to be supplied in the form of manure. Most of our farm crops supply all of the elements required by animals, and there is seldom need of a special provision of any particular element when food is provided in proper variety and quantity. When farm crops or purchased foods are consumed by animals, the nitrogen, potash and phosphoric acid which they contain, that are not needed for the purposes of the animal economy, are voided in the manure.

The Value of Fertilizers.—The value of barn-yard manure will depend, in the first place, upon the amount of nitrogen, potash and phosphoric acid in the feed consumed, and in the second place, upon the conditions under which the manure is kept and applied to the soil.

On the average, animals will retain for the purposes of the system not more than ten per cent. of the nitrogen of the consumed food, and but from 1½ to 2 per cent. of the potash and phosphoric acid. Pigs will retain of these constituents rather more than sheep, and sheep will retain slightly more than cattle.

With store stock, making no gain, the manure will contain all of the valuable constituents of the feed. Cows giving milk and young growing stock will appropriate more of the nitrogen, potash and phosphoric acid, than fattening animals, and their manure will accordingly be less valuable with the same feed.

The following table of the value of the manure produced from different articles of feed, when consumed by average farm stock, has been made from the latest data furnished by the American analysis. The values are based on the cost of the nitrogen, potash and phosphoric acid in the form of commercial fertilizers.

Value of manure produced from one ton of feed by average farm stock:

KIND OF FEED.	Value of manure from 1 ton of feed.	KIND OF FEED.	Value of manure from 1 ton of feed.
Corn	$6 20	Timothy hay	$6 25
Corn stalks	4 10	Potatoes	1 68
Oats	6 62	Carrots	87
Oat straw	3 00	Swedes	1 10
Wheat	7 24	Mangles	1 43
Wheat straw	2 26	Corn meal	5 33
Rye	6 70	Middlings	8 90
Rye straw	2 60	Shorts	10 64
Barley	7 49	White bean	12 50
Barley straw	2 75	Brewers' grain—	
Peas	13 50	Fresh	3 60
Pea straw	5 00	Kiln dried	12 80
Beans	15 00	Malt sprouts	16 50
Bean straw	6 00	Linseed meal—	
Buckwheat	6 88	Old process	20 00
Buckwh't straw	4 94	New process	22 00
Fodder corn (green)	1 10	Cotton seed meal	28 50
Clover hay	9 50		

The actual values will, of course, vary somewhat with locality, but the relative values will remain essentially as represented.

Barnyard manure is the residual producer of the farm, resulting from the the manufacture of feed into animal products of greater value. This residue is too generally neglected, and statistics indicate that the losses involved in careless methods of management must be enormous.

Value of Manure.—From the latest estimates of crop returns for the year 1884, the value of the manure produced in the United States, or what should be utilized as such under a consistent system of management, cannot be less than $1,269,000,000.00, which is more than twice the value of the total agricultural exports for the same year. It is undoubtedly safe to assume that at least one-half of this valuable residue is lost from neglect, or ignorance, of the best methods of preserving it. From this it

must be seen that if this residue was all utilized the agricultural exports of the country might be doubled without making any additional draft on the elements of soil fertility. In the State of Wisconsin we cannot estimate the value of the barnyard manure for the year 1884 at less than $35,000,000.00, and the losses involved under present conditions of farm practice must, in the aggregate, be at least $15,000,000.00. An annual preventable loss to the farmers of the State of such magnitude should receive thoughtful attention, and a wider diffusion of knowledge relating to the sources of such wastes must be recognized as of the greatest practical importance.

Conserving Fertility. — The best methods of conserving the elements of fertility in the form of barnyard manure may be readily understood and the consistent and systematic application of a few simple principles will serve as a safe guide in practice.

From the limits assigned to this paper in the bulletin, a concise outline of these principles can only be presented, without any detailed discussion of the subject.

Growth of Crops.—Although other constituents may have a more or less direct influence on the growth of crops, we may confine our attention to the nitrogen, potash, and phosphoric acid contained in barnyard manure, as the elements of dormant interest, from the fact that the natural supplies of other constituents, under ordinary conditions, seem to be ample for the purposes of plant growth.

In fresh barnyard manure the nitrogen is mostly in organic combination, and not in a soluble form; there is but little ammonia in the form of salts, and the mere traces of volatile ammonia are practically not worth considering.

Potash and phosphoric acid are in the main in insoluble combinations.

In the almost entire absence of volatile constituents, of manurial value, the only waste of fresh dung of practical interest will be from leaching of its small proportion of soluble constituents.

Microbes.—In fermenting barnyard manure a variety of changes take place, the sum of the effects being to increase the solubility of the elements of fertility. The fermentation of manures is caused by minute living organisms called microbes, each species producing a particular kind of fermentation. In the putrefactive fermentation organic nitrogen is changed to the form of ammonia, and the volatile ammonia that may be produced in the interior of the heap becomes fixed by organic acids and changed to the soluble form, and there is little or no escape of volatile ammonia.

The offensive odors escaping from manures in the form of gases are mostly of no value as fertilizers, and the sense of smell is not therefore a reliable test of manurial values. Another microbe, or perhaps a number of forms, changes ammonia, and likewise organic nitrogen, to nitric acid. The potash and phosphoric acid are likewise made more soluble in the processes of fermentation.

From the increased solubility of the valuable manurial constituents in the process of fermentation the dangers of loss from leaching are intensified, without any escape of valuable materials in the volatile form, of any practical importance.

When and How Applied.—In farm practice the bulk of the manure should be applied to the soil before fermentation takes place. Fermentation of manure in contact with the soil aids in its disintegration, and by this indirect action liberates plant food that would not otherwise be readily made available.

From the facts which have already been presented it will be seen that ab-

sorbents of volatile matters are not important factors in the preservation of manures. They may be employed to deodorize the air of stables, but to prevent the escape of fertilizing materials in the form of gases, they may do harm by diverting attention from the real sources of waste. The specific action of the absorbents in popular use were discussed in detail, and the fallacy of their assumed influence was pointed out.

How Kept.—When manure is kept in flat, compact masses through which water is not allowed to leach, to wash out the soluble constituents, fermentation will be retarded or entirely prevented, the valuable fertilizing materials will be retained, and there will be no waste of nitrogen in the volatile form.

With high piles the liquids containing the soluble constituents leach downwards, the upper part of the pile is deprived of a part of its fertilizing constituents, and unless extraordinary care is taken the liquids are finally wasted.

Manure kept under cover, and protected from rainfall, may be preserved without loss with a moderate amount of litter to absorb and hold the natural liquids. Manure cellars are not necessary, and under ordinary conditions of practice it is better to dispense with them entirely. Manure may be preserved in open yards with a minimum of loss if sufficient care is taken to prevent the leaching and escape of liquids. The yard should have a water tight and slightly concave bottom, the manure leveled down with an abundance of litter to make a flat, compact mass as the animals tread it down—water from the eaves must be carried off in suitable gutters, and no liquid must be allowed to run from the yard. The rainfall will do no harm if there is litter enough to absorb it and keep the yard comfortable for cattle, and it is not allowed to soak through the manure and wash the soluble constituents away. Evaporation from the surface will often equal or exceed the rainfall in amount, so that provisions for retaining all of the rain that falls during the year is not needed.

How Spread.—The dangers of waste will be diminished by applying the manure to the soil under proper conditions as soon as it conveniently can be after it is made.

Manure taken to the field should always be spread at once over the surface. It should not, under any conditions, be distributed in small piles to be spread afterwards. Manures should be kept near the surface as there may be loss from leaching to the subsoil if not immediately appropriated by growing plants. If manures are plowed under, a shallow furrow slice will be best, as the microbes of nitrification act more efficiently in the preparation of plant food near the surface.

How to Prevent Waste.—The conditions required for preventing a waste of manures may be briefly stated as follows:

1. Water tight floors and manure gutters, with sufficient litter to absorb all liquids.

2. Keep in flat, compact piles, protected from an excess of water, and provisions for preventing all waste from leaching.

3. Apply to the soil as soon as convenient, and spread immediately on the surface.

ADVICE AND BREED.

By R. G. HORR, Michigan.

Fourth Paper.

An American Peculiarity.—Some cynical person has said that American people are peculiarly noted for one characteristic; he says that as a rule they talk best on the things they know the least about. That being the case, I am in excellent condition to talk to a farmers' institute, and I think there is some truth in the saying, for I think I have noticed in my entire life, that people do usually talk the best in this country about things they know the least about. If a man is sick, he can always get a prescription from every man and woman he meets right on the street; they will always tell him just the thing that is needed to cure him, that is everybody but the doctors. They will give you their pills because it is their business, you know, but if you could see the doubt in their own minds as to whether they were going to kill or cure you, you wouldn't take their medicine. You remember we fellows who staid home during the war. You let us get down town in some office and couldn't we put down rebellion in good shape, while the people at the front were generally a little doubtful how the thing was coming out.

Gratuitious Advice.—Every farmer here knows as a rule you can get advice how to run your farm better and easier from the man who never plowed a furrow in his life or hoed a cabbage, than anybody else. I don't mean any reflection on you, Brother Keyes. I used to, when young, teach school and board around, and do you know, I could always get advice as to how to run my school from every patron in the district. Any preacher will tell you that he can always get advice how to preach a sermon, just what to say, when to say it, and how to say it. He will always get it the most readily from the fellows, who, to save their souls, can't tell the difference between orthodox and burdocks. After this explanation, you won't think it preposterous in me if I talk about cattle, will you? Of course, I need not tell you that I have one big advantage in talking about cattle, and that is, that I was raised myself upon a farm, and, by the way, did you ever see a man that wasn't raised on a farm? I'd go a good ways to strike a man of that kind.

Breeds of Cattle.—I am interested somewhat in the discussion that I have heard since I came in here on this question of breeds of cattle, from the fact that where I lived in our State, it is a subject of very great interest, and I was surprised to find my friend, Keyes, reading an essay to prove that the best cattle that there were in the entire world was a breed that I never heard of in my life. Most of these pictures hanging around this room, are familiar to me. Where are your Red Polled?

Now, there isn't anything that interests farmers in the cattle line more than the question of how you can get an animal that it will pay you to keep. That is

the only test of which cattle are good for anything; it is the kind that pans out well in the end. Do you know I have a sort of an old fogy idea that we have been struggling and fussing over this question in this country for thirty years a good deal, and you know the subject I am talking on is something I don't know much about, but I don't think for beef, we have ever beat the Shorthorn yet. I think we can improve our cattle by mixing them with any good breed.

Holsteins for Milk.—Now, have you ever noticed cows in pictures? Are they always just as they are in the barn? They vary in the barn; they never do in pictures, and isn't it true it doesn't make so much difference what breed of cattle you have? The best cows in every breed are pretty good ones, and the poorest cows in every breed are almighty mean, that is the fact about it. I have an idea that the best milkers to-day in the world are the Holsteins. I say that because I am better acquainted with them than any other of the modern animals in this country. Yes, I think they give more milk, but I don't think it is fair to test them by the rules that they adopt in showing these wonderful weights of milk. You take a big Holstein cow, and in order to get the record that they get, you have to keep two men feeding her, and one milking her, and if you keep that right up vigorously year in and year out, you will get considerable milk. I have an idea that for cheese making purposes, and for skim milk purposes, the Holstein is the best animal. For coffee, give me the Jersey, but I don't want her for anything except coffee. As a rule my observation is, the Jersey is too small. As a rule, she doesn't give milk enough for a good sized family, but as I stated a little while ago, you can get a pretty good cow if you get the best in any breed, and there is nothing that this country ought to examine more than to find out a breed that will combine the two things, as our friends said, beef and milk. I don't know, I doubt whether you can combine both those qualities, even in your Red Polled. I doubt it. I think as a rule an animal that is the best for milk is not very well adapted for beef; at least my experience is, that where an animal runs to beef she is a poor milker, and that a good cow never puts on flesh much while she is milking, and consequently I have an idea, that the great question of raising cattle should be divided into two classes. If you are going to make dairying your business, and it is a very good business in these days, breed your cattle for milking, and if you are going to feed steers, and run to beef, I would run to beef and let the milking business go. Some people may raise both. There may be animals in the world that are fitted for both, but I have never discovered them. I know they tell me the Holsteins are wonderful beef cattle. I never saw any of them that were.

Herefords and Durhams.—Where we live we run to Herefords. There are some very valuable ones near where I live and they are very fine for beef purposes, that is, those they take to the fair. I don't know how they do on an ordinary farm. The animal that pays best is the one that we men who don't run to fancy cattle are going to keep. The cattle we want are those that are hardy, those that look durable, even if you don't feed them all the time or curry them every morning. I don't know just exactly, nor do I think anybody knows, just what breed of cattle we should raise. In the country where I was raised, an old English gentleman brought with him from England some old Roan Durhams, and from that day to this, you go into that neighborhood

and the steers in that neighborhood will average three or four hundred pounds more than they will average in any other place in that section of the country; that man did the farmers of that community more good than they could ever comprehend, even after he has been dead and gone thirty years, and yet the improvement in stock that he introduced into that township is living right on to-day; that is the reason that I am prejudiced in favor of the Shorthorns.

At our State Agricultural Society, a few weeks ago, were some cattle they called Red Durham, but they don't look at all like those I am talking about. They lacked size, they lacked what I called the beef qualities, they were very sleek looking animals, but I have an idea that for the farmer, what you want of a steer is one that will weigh. At least, that has been my experience. When I had one to sell, if he didn't weigh anything, I didn't get much for him. Consequently, I am in favor of those old fashioned Roan Durhams for beef, that you could make without constantly feeding them. Now, if somebody could only invent or produce an animal that would get along without eating, that would be the stock to introduce; but as a rule you have to feed your animal everything that the animal makes into meat, and I say, as a rule, the old fashioned Roan Durham would appropriate more feed and come out with more meat than any animal I ever met in the United States.

The Great Industry.—Now, my friends, there are people here who want to talk on something they know about, and consequently I must just simply thank you for this kind greeting. I am very glad to have been here and I am going to stay and see what you people have to say, because we are all interested in the advancement of the great industry which lies at the bottom of all the industries of the United States. Without the products of the soil, our country would be of no use in the world. I believe in just such associations as this, and all I hope is that, as a rule, you will have people talk to you about things that they have investigated. What I have said was simply because they got hold of me and forced me to say something. I am very thankful to meet so many of the farmers of Wisconsin, and I hope hereafter some time, we may all meet again.

THE FARMER'S DUTY TO HIS SCHOOL.

By C. W. GARFIELD, Lansing, Michigan.

Fifth Paper.

Our Rural Schools—Are the fountains of agricultural progress in our country. Our future farmers and farmers' wives are largely moulded for their life-work within their precincts, and we should let nothing stand in the way of their highest development in method and results. We can afford to take time in a farmers' institute to discuss their weaknesses and lay plans for their betterment.

No Children to Send.—There is no

excuse in the fact that many of us have no children to send. The effect of poor tuition is felt by all, and I have no sympathy with people who raise a family of children and send them to school, simply to get them out of the way, with no farther thought concerning their environments when away from the parental eye. This carelessness with regard to the education of children through their associations, is a fault which threads into every rural district.

Radical Errors.—The following I name as the most radical errors that crop out prominently in our system of schools:

1. It is desirable to secure the maximum length of term of school most for the minimum amount of money.

2. The number of days in the school room multiplied by the number of hours per day determines the value of the school.

3. Money used in embellishing school premises is wasted.

4. Children attending a rural school are quite safe in their moral development.

5. It is natural for little girls to be neat in their appearance and manners; but boys are of a rougher type and must have "full swing," and no matter how they are attired.

6. As soon as children can walk to school, they should go, so as to be out of the way, because they are only a nuisance at home; and it is the teacher's business to care for them and instruct them.

Importance of Good Teachers.—To the good farmer I would put the matter in this way: A well-bred animal can not be trusted to a poor hired man. You seek the most trusty and skilled help to care for your high-bred stock, and then you look personally after their development. You can not afford to do less by your children. The matter of compensation to the hired man or woman to whom you consign them at school is of little importance, provided you get the right help. The herdsman who simply feeds, waters and cards, is unfit for his place. He must study the individuality of the animals and suit his attention to their needs. The teacher must have the "herd" of children close to his heart, and if properly equipped for his work in mind and sympathies, the work is not simply six hours per day, but all of his waking hours. The farmer should demand this for his children and pay for it commensurately.

What Tuition Consists In.—Tuition is not simply assignment of lessons and listening to recitations. Thousands of things in the outside world can be made to contribute to the moulding power in the school-room, and every parent should appreciate the instruction that may be given in the fields and woods and by the roadside. If you are fortunate to secure a teacher who can grasp this work, do not for your children's sakes repress the efforts by accounting the hours which the teachers spend with pupils out-of-doors, giving them glimpses into the great world about them, as lost in settling up the wages for the term.

A Discouraging Feature.—One of the most discouraging features of our common school training is, that the accompaniments of the instruction given are in such discordance with the best things to be taught. Children are expected to be neat, orderly, methodical etc.; in truth to grow in those attributes of character which will, later, aid them in getting a comfortable living and enjoying to the fullest extent the income of thrifty habits. They are to acquire these attributes of character in a schoolhouse that has less care than an ordinary

horse-stable; upon grounds that are not cared for as well as the average meadow; at a place where no respect for public property is expected; in truth, the most general excuse for want of attention to school premises is that the children will so soon destroy their comeliness.

Why Boys Are Destructive.—Is it a wonder that boys throw stones through the windows of empty houses when their parents expect they will, without compunction, pull a clap-board from the school-house at will? Is there so much to blame in a child who breaks a twig from a valuable ornamental shrub, when his father's excuse for not planting shrubbery about the school premises, is that the boys will destroy every green twig anyway, and there is no use in planting anything?

Respect the Rights of Others.—There is no surer way to teach children respect for the rights of others than to practice it upon the school grounds. There is no surer way of inculcating principles of correct taste than under the guidance of the teacher, in making delicately beautiful every nook and corner about the school-house and grounds. There is surely nothing that can be taught the average girl and boy from the farm that will ultimately give them more pleasure than facts concerning trees, plants, insects and animals about them; and there is no discipline superior to learning to record accurate and honest observation.

The School House—Should be kept sacred to school purposes; should be maintained as a model of neatness. Not an obscene mark should be allowed to remain on it for a day. The closets should be kept tidy and in a perfect state of repair, and the girls' closet should be so arranged by planting of shrubbery as to have a somewhat secluded walk to it. Parents and officers cannot demand less of a teacher, than that his association at the children's games and about the premises, shall be so intimate that he shall know about the tendencies, if there be any, toward corruption of morals.

The seeds of the worst forms of immorality are sown at our schools, and for their rapid development our parents are directly responsible, owing to their utter neglect of matters at school.

Country Boys—Are too often country boors, and grow up to be utterly careless of manners, of dress and address, because courtesy and tidiness of apparel are not expected of them. Many a gentlemannered woman is worried daily over the coarse, thoughtless husband, simply because as a school-boy he was not given proper tuition in the amenities of life which were dubbed by his elders as "city fangles."

The Farmer's Duty—To his school, farther demands that he should think enough of his children to keep them at home, and teach them the "ins and outs" of the farm, until they are of a suitable school age. There are worlds of things for the little ones to learn about the farm premises, while their little bones are hardening, and it is brutal to compel them to set upon hard benches several hours a day. Parents should give attention to these early years of tuition, and not delegate it to a stranger.

The Mother's Duty.—But mothers often say to me: "I have no time for this work, and the little ones, and must send them to the teacher, who is employed for the work." Without farther argument I must answer firmly and feelingly: "Then you ought not to be a mother." Home, childhood and parentage lose all their charms when parents can not spend time to guide the germinating minds, for whose existence they are responsible.

Your Duty—To your teacher does not rank among the lesser duties. Once given an instructor suited to the work, he should secure your keenest sympathy, and most earnest support. Only in this way can the tuition secure its best fruition. New methods should be secured kindly; and all their social accompaniments, which combine entertainments with instruction, that are instituted in connection with the school life, should be warmly supported; and to ensure the highest benefits therefrom the spirit and enthusiasm of the juniors should pervade the homes of the school patrons. Singing, writing, reading, and spelling schools, lyceums and debating clubs, organized by earnest, original and enthuastic teachers, should interest every parent as well as child.

Our Teachers.—But a small proportion of those who attend rural schools ever have opportunities of academic and collegate courses. But if our common schools are made what they may be, the leaders of the next generation will largely be those, whose only certificate of graduation will be for attendance at the country schools. Let us not forget our duty, but begin now to take an abiding interest in the education of our children and use every means in our power to arrange for the best tuition, with pleasant and sympathetic environments; and show our interest in the growing ones by our presence and encouragement.

THE APIARY.

By Mrs. HILLS, Sheboygan County, Wis.

Sixth Paper.

A Woman's Experience.—A recent writer on the subject of bee-keeping has remarked, that to conduct an apiary, *successfully*, requires more study, experience and skill, than to guide a steamship across the Atlantic ocean. In view of such a statement as this, it would seem preposterous for a novice with only four years' experience, and a woman at that, to attempt to give much information in regard to this industry. But considering the numerous letters received from women, earnestly asking as to the possibility of thus obtaining bread for themselves and their children, an account of one woman's experience in the work, may not be out of place; and as outside the ranks of bee-keepers, very little attention has been given to the subject, some general ideas gleaned from the studies of advanced apiarists may be of interest. Were the question to arise here to-night as to the source from whence *sweets* were obtained, before the sugar cane was brought from its native India and domesticated in Europe and the more Western world, how many could give an immediate and intelligent answer? We are told, that although there are evidences of the very high antiquity of the sugar industry in India and China, yet its development in all other countries is of comparatively recent date, and that the introduction of the sugar cane into Europe appears to have been one of the results of the

Crusades. It was grown in the island of Cypress about the middle of the twelfth century, from thence, at a later time, transplanted to Madiera, and at the commencement of the sixteenth century, was carried from the latter island to the West Indies. The first sugar refinery of which we find any notice, was one in Dresden about the year 1600. Still, the manufacture of sugars in the countries to which it had been introduced, made but slow progress, and on account of its dearness, its use was limited to the wealthy. Sugar appears to have been but vaguely known to the ancient Greeks and Romans. A line from a Latin poet indicates a knowledge of its existence merely as a curious fact.

Antiquity of Bee-Keeping.— The question, from what source did all the teeming populations of ancient times and of the succeeding middle ages obtain their sweets, becomes one of considerable interest. As possibly affording some clue to the solution of this question, there may be found, it is said, in one of the earliest extant treatises on botany, written in the third century before Christ, an allusion to "honey in reeds"; just as a similar treatise at the present day might contain an allusion to "sugar in beets." The phrase is certainly a very suggestive one, and appears to indicate that the word *honey* at that time was used in much the same sense as is the word sugar with us. More than two thousand years have passed since the ancient botanist wrote his treatise; and the curious honey producing reeds, of which he knew so vaguely, have made their way around the globe, and played their part in shaping the civilization of a new hemisphere. How familiar to our ears have become the accounts in the Bible of the "land flowing with milk and honey." And now among the old land-marks that are being swept away by the relentless searchings and siftings of the modern student, in both sacred and profane records, we are told that this familiar phrase might perhaps, be more properly rendered, "a land flowing with milk and grape juice." What a startling idea! If mankind progresses in circles, or in spirals, we might almost imagine, that we, in our day, had just arrived at the same identical point again. Grape juice, indeed! Let us hasten forward to the safe ground where the bee is monarch and queen. The earnest Semitic and Indian records, Egyptian sculptures and papyri, as well as the poems of Homer, all testify to the early cultivation of bees, by man, for domestic purposes. And their frequent representation, in Egyptian hieroglyphics, wherein the bee occurs as the symbol of royalty, clearly shows, that their economy, with a monarch at its head, was known. A hive, too, figured on a very ancient tomb at Thebes, is evidence of the early domestication of the bee there; and of how early, even historically, it was brought under the special dominion of man.

Bee Literature.—It was estimated, over three hundred years ago, by De Montfort, who then wrote a work on bees in French, that between five and six hundred authors had preceded him on the subject of bee-keeping. Most of these books were written in Latin and are lost to the world, very few having been handed down to us. From remote antiquity the practice has prevailed in Egypt of collecting great numbers of hives in vessels on the Nile, and transporting them from pasture to pasture according to the succession of flowers in the different districts. A somewhat similar practice prevails on the Rhone in France; and the conveying of bees from place to place, has been usual in Greece, Asia Minor and Persia, from the earliest times. Strange to say, it is claimed that the honey-bee was not a native of the western continent. We are told that, without doubt, there

were no honey-bees here until introduced by the Caucasian race. This seems the more strange as, it is said, that all the continents and islands of the eastern hemisphere abound with them. It is one more illustration of the inextricable puzzles connected with the geographical distribution of animals. Mt. Hybla in Sicily, on account of its great variety of odoriferous flowers and abundance of honey, has been poetically called the empire of bees, and Hymettus in Attica is in the same way famous. The German black or brown bee is the variety best known; as through all the ages, it has been most widely distributed. We find, however, that the Italians were known, both to Aristotle and Virgil, who sang of the variegated, golden bee. It is said that the wider distribution of the German bee can only be accounted for by considering the more vigorous, pushing habits of the Germanic races of men; who not only overran and infused new life into southern Europe, but have vitalized all Christendom.

An Important Industry.—At the annual meeting of the North American Bee Keepers' Society, held at Detroit in 1885, President Willets, of Michigan Agricultural College, in his address of welcome, used these words:

"Yours is no insignificant industry. You represent three million colonies of bees, with an annual product of surplus honey of a hundred million pounds, and the production is annually increasing. The best minds in the field of science have contributed to the more successful promotion of the industry. They have studied, observed, experimented and written about bees and their habits, until we know how best to rear them and how best to utilize their harvest of sweetness; so that, to use the words of a learned judge of one of our courts, the bee has become almost as completely domesticated as the cow. Its habits and its instincts have been studied until it can be controlled with nearly as much certainty as any of our domestic animals, and there is far less danger of serious injury from the bee than from the dog. For many years the burden of the efforts of our most prominent apiarists has been to induce our government to extend to apiculture proper recognition and protection, as one of the important national industries."

One result has been, that through the efforts of Prof. C. V. Riley, of the Agricultural Department at Washington, and others, the government has established an Apicultural Department, and is conducting an experiment station at Aurora, Ill., under the charge of Mr. W. McLain.

Special Education.—The Michigan Agricultural College also makes a specialty in bee culture, having established an experimental apiary, in charge of Prof. A. J. Cook, where pupils may receive practical instruction in the habits and propagation of bees. The managers of State and county agricultural fairs have also done much to encourage this industry, having sometimes offered premiums amounting to several hundred dollars, for the best display of bees, honey, and implements for the apiary. In his maunal of the apiary, Prof. Cook says:

"Apiculture, in adding so immensely to the productive capital of the country, is worthy, as an art, to receive the encouragement and fostering care of the State. All this annual crop of a hundred million pounds of gathered nectar woud go to waste, were it not for the apiarist and his bees. Millions of wealth are annually lost to the world, through ignorance of bee-culture; for it may be doubted if, in almost any district of country, the number of bees kept is so great as nearly to exhaust the floral resources; and in all probability, this industry may yet become a much greater source of wealth than it is at present. Already a large amount of honey is annually consumed, in the various industries, of pork-packing, tobacco, and other manufactures. The commercial value of beeswax is also very great, and if it were possible to ascertain the total of the quantity produced, it would cause great surprise at the amount of valuable ma-

terial derived from a source apparently so insufficient. Mr. Robert Eldridge. of Cincinnati, Ohio, states the annual yield of wax in Russia alone, to be nearly 5,000 tons; and this is nearly all consumed at home, so large is the quantity required in the ceremonies of the churches. Nearly 500 tons are annually imported into Great Britain."

In Germany, bee-keeping is taught in many of the public schools; and the government also provides instructors in the art, who go from town to town, as their services are needed. The Germans understand the science of economy too well to allow the wealth thus stored in their fields and forests, to go to waste; and it is said, that in Switzerland, honey is as common an article of food as is butter in America.

Fertilization of Plants.— Prof. Cook, in an article on Horticulture, says:

"Many of our flowers, such as clovers, squashes, and fruit blossoms, fail of fruitage, unless some insect bear the pollen of one blossom to the pistil of anoher. It has been repeatedly demonstrated, that if these plants be screened from insects, the yield of seed and fruit will be but partial."

Prof. Beal and the students of Prof. Cook's class, have tried some very interesting experiments of this kind with red clover. All the plants under observation were covered with gauze, that the conditions might be uniform. Humble-bees were placed under the screens of half these plants. The insects, at once, began to visit, and sip nectar, from the clover blossoms. In the fall, the seeds of all the plants were counted, and those from the plants visited by the humble-bees were to those gathered from the plants shielded from all insect visits as 236 to 5. Thus we see why the first crop of red clover is barren of seed; while the second crop, which comes of bloom, visited freely by humble-bees, whose long tongues can reach down to the nectar, at the bottom of the long flower tubes, is prolific of seed. This fact led to the importation of humble-bees from England to New Zealand and Australia, a few years ago. There were no humble-bees in Australia and adjacent islands; and the red clover was found impotent to produce seed. Alsike clover, a hybrid between the white and the red, has shorter flower-tubes, which makes it a favorite with our honey bees; and so it gives a full crop of seed from the early blossoms. When Mr. McLain has developed the coming American bee, with a tongue seven-sixteenths of an inch long, then our farmers will be able to raise seed from the first crop of red clover; as the honey-bees, unlike the humble-bees, will be numerous enough, early in the season, to perform the necessary fertilization.

Location of Apiary.—In locating an apiary, of course this matter of bee-pasture is the first to be considered. In this locality, a great part of the honey crop is gathered from white clover; though occasionally something is obtained from dandelion, apple-bloom and linden. I have never been able to obtain anything whatever, from buck-wheat, or from any fall-bloom. I began to keep bees in the spring of 1884, with two colonies of hybrids, in old-style box-hives. Never having examined a colony of bees, nor seen a swarm, my knowledge of the business was entirely theoretical. A good deal of time had been given, during the previous winter, to the study of various bee-books and periodicals, treating on the subject; and some lessons in the use of a handsaw and a ladder were attempted in a very private way, in which necessity was the only teacher.

Implements for the Apiary.—Various implements necessary in the hiving of swarms, and in other difficult operations, had been prepared. Thus equipped, matters went well that first season —much better than there appeared

reason to expect, from a first effort. Perhaps two-thirds of the time, during all those spring, summer and autumn months was spent in the apiary working, watching and experimenting. On account of the difficult nature of the work, it is not thought advisable, for a beginner, to undertake the care of more than a very small number of colonies. And it might be as well to understand, at the very outset, that without a genuine love for the pursuit, it is probably, worse than useless to attempt to engage in it, as it has been estimated that not more than two per cent. of all those who undertake the business make it a success. They like the honey, and the money, but are not particularly partial to the society of the bees,—especially when the remarks of the latter, become somewhat pointed and personal.

Enthusiasm Will Succeed.—Enthusiasm will carry one through many difficulties and thus, by means of natural and artificial swarming, the result of the first summer's work was an increase, from two to ten colonies; seven of which were placed in the cellar for winter, and three packed on summer stands, and the following spring found every colony in excellent condition. Thus far, success in wintering has been my one strong point, and whether placed in cellar, or left on summer stands, no colony has ever failed to come safely through the winter. And as successful wintering onght, perhaps, to imply successful beekeeping, it may be well to describe the methods by which this success has been obtained, and then decide whether, as appears to me, it has simply depended on providing abundant food and warmth. In studying this subject of wintering, my attention was early drawn to what appeared to me two very importaut conditions, necessary in attaining the best results; i. e., contraction of the brood chamber in winter and early spring, and profection after removal from the cellar, from the cold waves of the spring months.

The Hive.—The problem involving the method by which these desired results might be obtained, defied all attempts at solution for many months. But after much study the answer slowly evolved itself out of the chaos, and cross-wise frames, in Langstroth simplicity hives, secured the two-fold advantage of contraction of the brood chamber and spring protection. On the approach of cold weather, chaff division-boards, two inches thick, were placed all around the inside of the hive, thus contracting the brood chamber one-half. Six or seven cross-wise frames, containing not less than thirty pounds of clean stores, were then hung lengthwise in the snug nest, thus economizing heat, and bringing all stores within easy reach of the bees.

Stored in the Cellar.—Thus packed, and placed in the cellar with chaff cushions over the frames, the temperature has been sometimes allowed to descend almost to the freezing point, without visible effect upon the bees, and thus protected they have been removed to summer stands in spring with entire freedom from that most disheartening of all diseases to the beekeeper,—"spring dwindling."The temperature of the cellar has varied from 35° to 50°, remaining most of the time at about 40.° For outside wintering, each hive after being packed as above described has an additional outside case, or dry goods box placed over it packed with three or four inches of chaff.

Protection of Colony.—A colony thus protected, with two inches of chaff inside the walls and three or four inches outside with chaff cushions above the frames and abundance of stores within easy reach appears to defy the effects of our very coldest weather. This method

of packing inside the hives involves a greater amount of labor than most beekeepers think it profitable to perform, but its exclusive practice in my own case, has resulted in perfect success, as I have never lost a colony.

Spring Protection. — Mr. W. Z. Hutchinson, of Rogersville, Michigan, speaking of the absolute necessity of spring protection, advocates an outer case with packing of chaff or saw-dust to be placed over each hive when removed from the cellar. This does not secure contraction of the brood chamber, but the construction of the Heddon sectional hive which he uses itself secures contraction. Now as to styles of hive and methods of securing the honey crop —they are almost as numerous and as various as are the beekeepers. Each beginner must select, as best he can, his hive, and his method and follow out the latter if the bees will permit until he has evolved a method of his own.

Profits.—As to profits, I can only say, that my credit page shows a balance something like this: Forty colonies of bees, twenty-five additional empty hives and a tolerably complete supply of fixtures. To these may be added the benefit of four years experience, and greatly improved health. As it is not proposed further to increase the stock each colony ought to yield hereafter an annual surplus of fifty pounds of honey. Some beekeepers say 100 lbs and some even more than double the *latter* amount. But these are mostly men. Women have better judgment than men and are more moderate in their expectations, and thus they reap the advantage of being less often disappointed.

Honey for Market.—A few words might be said as to the manner of preparing honey for market. In my experience, the first and most indespensible requisite in the production of a first-class article is that the honey should be completely capped and ripened by the bees. To this end, the practice of the so-called tiering-up system appears indispensible and, if it is designed to find a market in the large cities, it seems best to use the highest priced white poplar sections and shipping crates,—the latter to hold no more than one tier of sections and not over twenty-five pounds. There also appears to be a demand for a neat small six pound crate. By the use of tin or wood separators between the sections while being filled, a beautiful uniformity may be secured and these uniform sections may be shipped with much less danger of leakage. The removal of all propolis or bee-glue from the sections should never be neglected if it is desired to place upon the market a first-class product. All these precautions necessitate a very great amount of extra labor.

A Labor of Love.—Thus far this has been a labor of love with me and done without much expectation of reward other than the satisfaction of doing good work. For, outside the large cities, honey is usually *honey*, if the quality is good, without much regard to its general appearance. And now the question is being continually asked, "is bee-keeping a good business for women?" It would seem that in this artificial, high pressure age, with its stimulous of hot-house culture and the dire necessity of keeping up with the crowd, that *any* occupation tending to lift man out of himself and bring him nearer to nature, must be a blessed boon, and especially so for women with their more sedentary employments.

A Farmer's Life.—In the same way it would seem that a farmer, taking life, as it were, at first hand, must occupy the most healthful, natural and proper position in which it is possible for man to be placed and that, thus placed, he might be most likely to secure immunity

from the hurry and worry of nineteenth century unrest and the dread malady of thought — of unavailing and fruitless conjecture. In the struggle for existence how often the question will arise as to who is fittest to survive. Is it the generous, the pious, the noble-hearted, the forgiving, the humble, the truthful, the honest and the kind—or those who are strongest in selfishness, in craft, in hypocrisy, in brute force, in false pretence, in unscrupulousness, in cruelty and in avarice? Alas, how many will fall by the way, mental or physical wrecks.

A Panacea for Human Ills.— Let one suffering from the attacks of this latter day disease — too much thinking — try, for instance, as a remedy, *pulling weeds*. It has been affirmed in all seriousness by one who knows whereof he speaks, that *pulling weeds* has more than once proved an antidote for many of the ills of life. Let him try cultivating a strawberry patch and breathe the odor of the freshly turned earth; let him try keeping a colony of bees and see what free air and sunshine will do for him, and if possible, let him accompany his army of little work people to the woods for an hour and watch them as with their tiny brushes and baskets they gather the pollen from the elder tassels in early spring, or listen to their murmuring music as they sip the nectar from the linden blossoms in later summer. Let him there inhale the life-giving essences of balsam and pine, of mosses and ferns and wild flowers. So potent is nature in her powers of healing that could he spend a month here in the heart of the forest he might, perhaps, on his return to civilization, pass unrecognized among his nearest friends.

A Plea for Broader, Fuller Life.— Let the farmer give his boy and girl a corner for a flower or vegetable garden and a colony of bees. It may tend to keep them on the farm, and strengthen their love for country life. It will not, in any case cost much, and may be the means of adding one less to the ever increasing number, who, without definite aim, crowd into the large cities, where, if no worse happens, independence and individuality are too often lost amid the whirl and excitement of the hurrying throng.

Conclusion.—A modern philosopher tells us of a sort of mental gravitaion, for which we, as yet, have no name — by virtue of which it is deduced that if one man in twenty thousand, or in thirty thousand eats shoes, or marries his grandmother, then in *every* twenty thousand or thirty thousand will be found one man who eats shoes and marries his grandmother. If this principle be true, it may not seem too improbable to infer that one other woman here present to-night may also find her tastes and inclinations turning in the direction of bee-culture and that, thus, this poor attempt to give a few facts and hints on the subject may find its sufficient excuse.

HORSE SESSION—MARCH 29.

THE CARRIAGE HORSE.

By A. O. FOX, Dane County, Wis.

First Paper.

A Handsome Team.—A short time ago I had some business in a neighboring town. About noon there came into town a man driving a handsome team; they were bays with nice, flowing tails; they weighed about 2400, and seemed to have a nice turn of speed. They were hitched to an old bob-sled, and had on rather a hard looking harness, but, nevertheless, everybody turned to look at them. They were toppy and, like old Bobby Burns' best girl (or rather one of his best, for he had the failing of his countrymen), there was "something in their gait, gard ond dress look weel." I concluded I would spot that team, and quietly sauntered along toward the stable to have a little chat with their owner. When I got there, I was surprised to find several others on precisely the same errand as myself. But the worst of it was the team had already been sold to go to New York at $600. These were carriage horses.

Points.—The carriage horse must be proud and commanding in his bearing and of good size. He must stand 15½ to 16½ hands high, and weigh 1100 to 1300 lbs. His color must be clear and rich, and without bad marks. His shoulders should slope gracefully back, and he should stand well up in the withers. He should carry a lengthy, well arched neck, surmounted by a cleanly chiseled head, free from meat, and with the visage of a thoroughbred. His back should be of medium length, not too much inclined to arch, and coupled strong in the loins to a long, smooth hip. His tail should come out well up, and float gracefully behind when in motion. He should have a good depth of girth, and a well sprung barrel. His limbs and feet should be absolutely sound, not too long between the joints, and not too straight in the hind legs, that he may have his feet well under him and have easy, graceful hock action. His action should be high, bold and square, and with sufficient speed to roll off eight to twelve miles an hour with ease and grace. His disposition should be spirited and intelligent.

A Source of Pride.—Wherever this horse is employed, whether in the plow, on the road, or before the family carriage, you find him performing his duty with ardor, energy — a source of pride and satisfaction to his owner.

Demand and Supply.—That there is a strong demand for these horses, and a very meagre supply, is beyond question. Our Eastern and Southern markets are

daily visited by representative buyers, not only of this country but of Europe, greedily seeking to capture every fine carriage and park horse they can lay hand on, at prices which yield very handsome returns to the careful breeder. At Lexington, Ky., I recently met a gentleman who was buying carriage horses for a firm in Liverpool. I saw him pay $1,600 for a pair of nicely matched five-year-olds. They were bays with black points, 15½ hands, and weighed about 2,300 lbs. They could trot in about 3 minutes, and were standard-bred. This gentleman told me he had great difficulty to find such; that they were either too small and plain or too sluggish and drafty in appearance to meet the requirements.

Good Coachers Scarce.—In a letter recently received from a firm of extensive horse dealers, of Chicago, they express their views as follows:

"We are dealers in coach and driving horses; can see at a glance how very scarce good coachers are becoming all through the country, and it costs no more to raise a coacher than a draft horse, and you get nearly if not quite *double* for him. It seems as though the breeders have entirely lost sight of all classes of horses but heavy ones."

Great sums of money have been invested in breeding the American trotter.

The Draft Horse Interest.—The breeding of draft horses has reached vast proportions. To say nothing of the growing horse interests of the Eastern and Middle States, we find horse ranches of great wealth and magnitude in the West. Among them are the Post Percheron Horse Co., of Wyoming, with 4,000 horses; The Percheron Norman Horse Co., of Colorado, 5,000 horses; Blunt & Evans, of Oregon, with a ranch of 7,000 horses. These are but samples of the many.

Carriage Horse Breeders.—Where shall we turn to find breeders who are making a specialty of carriage horses? I can name but several. Would it not seem wise, therefore, that we heed the lesson now offered us by the present condition of our cattle trade? When so many are now bent on the two extremes —flyers or drafts—is there not a golden opportunity for some of the conservative ones to take the middle course, and breed a fine type of carriage horse.

How to Produce Coachers.—With our close proximity to the largest and best city markets, and the shipping facilities which we enjoy, we can breed and place upon the market, this class of horses, in such form and condition as to be beyond the reach of Western competition. How to produce them is the problem. We have had offered to us as sires, the American standard trotter; the imported French Coacher; the imported Cleveland Bay, and the English Coach. These are all valuable to us, but must be used with great care and judgment. I am disposed to believe that the produce of the Cleveland and English Coach will not be generally satisfactory except when out of dams strongly trotting bred, as the get will lack the speed required by the average American, and they will lack uniformity, and will also be inclined to coarseness and soft feet. This is especially true of the English Coach.

The Cleveland Bay—As he is offered to us by the various importers, is certainly not highly enough bred, and is lacking in quality. I have seen them with very heavy bodies, supported by far to light a set of limbs, cut away at the joints, and an indication of coarse hair on the ankles. I have seen a few of the grades, and did not like them. I find my limited observation is backed by the experience of two very high authorities. The one is none other than the president of the

Cleveland Bay Society in England, in his address which is published in the London Live Stock Journal. My other authority is Stonehenge, one of the most celebrated English writers upon the horse, who treats of the Cleveland Bay in a chapter headed "other mixed breeds." That the Clevelands possess a great amount of English Cart blood is abundantly evident from perusal of some of their pedigrees.

The French Coacher.—I have seen but a very few grades got by French Coachers, and can scarcely express an opinion. The French Coachers are a product of the Arabian horse and the English thoroughbred and their get ought to be fine styled; but as to their gait, I believe they will not produce sufficient speed, although it is claimed that some of them trot in France. I also believe that the color of the get will not be sufficiently uniform to be satisfactory. I have noticed several imported French Coachers with very bad white markings, a great objection in carriage horses.

The American Trotter. — While some of the American trotters are under size, yet I believe that, up to the present time, they have given us the greatest number of our best carriage horses, and I believe that to the largest and best styled types of the standard American trotter, we must look for our sires. So far as my personal observation has extended, the finest carriage horses I have ever seen were got by sons and grandsons of Mambrino Chief and out of dams by old Indian Chief, or his son. Indian Chief was by Blood's Black-Hawk, he by Hill's Vermont. The dam of Indian Chief was by Ned Forrest, (Not Edwin) by young Bashaw, he by imported Grand Bashaw.

Indian Chief's 2d dam was by Douing's Bay Messenger, the latter breeding though both sire and dam to imp. Messenger.

The Kentucky Highlanders have also produced many fine carriage horses.

Results by Crossing.—I have seen very excellent results produced by crossing large Mambrino and Hambletonian sires on dams of the now nearly extinct Morgan type, and mares from that branch of the English Coach family which relate to the celebrated Rainbow Rockingham stock; Rainbow Rockingham was a son of North Star, and I believe traced directly thence to a thoroughbred. This English Coach cross has some objectionable features, however, among which is a tendency to feather about the limbs and a little coarseness, and the feet none too good.

A Hint to the Wise.— It will be noticed that all these families named run back not very remotely to the thoroughbred, from which fact we may gain a hint for our future benefit; provided always, that we select animals which have been properly toned down by judicious admixture of the best American trotting blood, and of the largest families. It must be remembered that the thoroughbred is no longer a very small horse. Many of our best thoroughbreds are large enough. I have seen imported animals weighing 1200 to 1350 lbs. I think imported London will weigh over 1200 lbs. But we do not need to go so far for what we require, since the very blood and characteristics we desire are embodied in some of our best American trotting families.

We may, therefore, select such standard trotting-bred sires as approach nearest to our ideal of the carriage horse, and which have shown their ability to impart to their offspring the required characteristic of size, style, color and soundness.

The Mare — Should approach the nearest possible to the required type standing 15 to 16¼ hands, and weighing 1,150 to 1,300 lbs. She must have a kind disposition, nice style and action, and rich, solid color. She should have a good tail, well carried; a smooth even contour, free from coarseness about the hips, although if she should be a little open in the ribbing-up, she is likely to be all the better breeder for it. She should stand well up in the withers; her neck good length and rather fine, with a moderate sized bony head. Above all, she must be a mare of good nerve and vigor, with a clear, full, expressive eye, indicating that she has intelligence and power, and a desire to use it. Such mares will usually be found to contain a predominence of good trotting blood, and, although they may fall considerably short of being standard-bred, they are a useful and valuable class of matrons, and within our reach.

Breed to a Purpose.—But we must breed close to a definite purpose. If we ever wish to produce valuable carriage horses we must keep clear of the undersized, low-necked, low-striding trotter, as also of the cold-blooded, heavy draft horse, although each may be right in its sphere.

Breed From the Best.—We have now reached that epoch in stock breeding when we must breed from the very best attainable, if we would cope successfully with the strong competition which surrounds us. If it be a draft horse, let him be the best of recorded sires. If it be a carriage horse or a trotter, select from the best families of standard, registered, American trotting blood.

An American Product.—In breeding the American carriage horse, we have a great advantage in the fact that we do not need to go abroad for our sires, nor depend upon imported pedigrees. We can select them intelligently, after having seen their sires and dams and knowing their history. They are strictly an American product, and in their patronage and improvement we are aiding in the establishment of a valuable American breed, which is already a wonderful example of what selection and education will do, and which has excited the admiration and opened the purse-strings of the world—the American trotting horse.

HORSE-BREEDING IN WISCONSIN.

By JOHN M. TRUE, Baraboo, Wis.

Second Paper.

400,000 Horses.— There are some 400,000 horses in the State of Wisconsin. Their valuation, as given by our last census report is approximately equal to that of cattle, swine and sheep combined. An industry bearing so close relations to the interests of the farmers of the State, and of such grand proportions, is entitled to our careful consideration. In opening the discussion upon the topic of horse-breeding, taken in connection with other farm enterprises, I wish to speak specially of that work as carried on by the average farmer, and to claim for it a degree of pleasure and profit equal to any other live stock enterprise.

The Best Success — In this field requires a natural and well-developed love for the work, an intelligent appreciation of the animal handled, and a business tact that recognizes the demands of the market, and brings its products to meet the requirements of such market. Men of means, who make the raising of fine farm stock merely a diversion, regardless of the elements of profit and loss that result from these enterprises, do not come within the limits of this paper. But for the horse-breeding farmer to blindly interpose his prejudices or whims, as applied to lines of breeding, and the quality of the animal he shall raise, between his financial interests and the market, is a kind of folly that reflects seriously upon the intelligence and business capacity of its possessor.

Few farmers can safely make the raising of horses a specialty to the extent that dairying, beef production and sheep husbandry are frequently carried, for except for special work, labor upon the farm and the raising of colts should be a combined interest.

Keep Brood Mares.— The farmer who has been accustomed to do his farm work with one team of horses, kept specially for work, and worked hard, may profitably keep four brood mares instead. The work will be more satisfactorily done, while the production of four good colts annually, will add very materially to the income from the farm.

Fall Colts.—When the brood mares are made the work animals upon the farm, fall colts may be raised to such an extent as to prevent those interruptions in work which might occur from the exclusive raising of spring colts. The fall colts, running with well-fed dams during winter, make a very satisfactory growth during that time, and go upon pasture in the spring on nearly equal terms with their spring cousins of a few months greater age. The fall colt at eighteen months is often equal in size to the two-year-old spring colt of similar breeding.

Inducements.—The statement that no more feed is required to keep the good colt than the good steer of equal age, or the boord mare than the dairy cow, is accepted by all intelligent handlers of good stock. From these premises

we enter the claim that no live stock industry offers equal inducements to the Wisconsin farmer to the raising of good horses. To substantinate this statement, we have only to cite the uniform, continued and persistent demand for good horses that has prevailed for years—a demand that increases in direct ratio to the improvement of our stock, unaffected even, by means of drouths that have seriously depressed the prices of other farm stock.

Kind to Raise.—What kind of horses shall the farmer raise? The horse that he is best adapted to handle; that his taste and capacity enables him to produce at the greatest net gain, due consideration being given to the cost of raising and handling, and the certainty and uniformity in quality and selling value of the entire product of the enterprise

This bars from consideration, first the miscellaneously-bred horse, the result of ignorance, parisimony and prejudice; the product of an indiscriminate haphazard co-mingling of all popular bloods of the past fifty years, giving us, to-day, the horse that is oftenest found upon our farms, and that, through lack of size and lack of quality, richly deserves the epithet, "scrub." Second, the *little* trotting horse. This animal may be a source of diversion, and, in special instances, of profit also, to men of leisure means and reputation in their chosen work but, while he may be well bred, his breeding has looked to the production of a special-purpose animal, and the purpose is so difficult of attainment, so uncertain in its degree of excellence, that he cannot be profitably bred by the average farmer. Failing to develop speed, his light weight renders him undesirable, and in the general market, this waste product ranks little better than the scrub. Size has come to figure very strongly in the requisites of the market horse. It is demanded in the typical roadster. It is a necessity upon the farm. There seems to be no limit for the admiration for it in the draft horse.

The Fine Roadster.—To the farmer of fine taste and discrimination, who readily recognizes style and finish in the horse, and is systematic and persistent enough to back these qualities with proper feeding, shaping and handling, the production of the fine roadster, offers an enterprise worthy of his best work. Between the breeding of the trotter, and the draft horse that has in the past claimed most attention, the fine roadster has been neglected, and to-day a rangy, stylish, high-stepping horse, of good color, weighing from 1100 lbs. to 1300 lbs., brings a high price to the lucky owner. The great barrier to the supply of the popular demand for these horses, is the lack of suitable dams for the work, animals of sufficient size, style, and finish being rarely found upon our farms. Dams of requisite quality, crossed with larger types of our American-bred trotting horse, or the French coacher, animals weighing from 1,200 to 1,400 lbs., should, with tolerable surety, give us excellent results.

The Heavy Horse.—But, from the excess of the demand for, and the uniformity of the product obtained, the lack of necessity of special adaptation to, or skill in the work, a large proportion of our Wisconsin farmers will do best to devote their attention to the heavy horse. A cross of the full-blooded Percheron, Clyde or Shire sire, with judicious selections from the dams found upon our farms, will give us a class of hardy, strong boned colts of attractive appearance, early growing to the size and form that meet the market requirements, at highly renumerative prices.

No special handling or breaking is necessary to put them upon the market. Buyers will come to the farm and purchase this stock when three or four years old. Blemishes, bad markings or unsatisfactory colors, that would seriously interfere with sales of roadsters, do not so materially affect the price of the heavy horse.

Superiority of Breeds.—It is not proper at this time to enter into a discussion of the superiority of breeds. The Clyde, Percheron or Shire are each worthy of our best consideration. But the breeder should thoroughly believe in his favorite. He should, therefore, before entering upon his work, satisfy himself of the superiority of the breed he selects, and thereafter zealously defend and persistently patronize it. Cross-breeding, even of the draft breeds should be discountenanced. Do not try to breed the "general-purpose horse." He is an uncertain quantity, about whose form, size and movement great difference of opinion exists even among those who claim to believe in him.

By breeding as best we may for the production of the roadster, we shall find quite a percentage of our product not equal in form or style to the requirements of the market. These will satisfy a portion of our general-purpose men, who do not choose to keep the best roadsters for general work. Not all of the colts raised for the heavy horse market will be sufficient in size to bring the best prices. These lighter weights, weighing from 1,200 lbs. to 1,400 lbs. are admirably adapted to the wants of the general farmer.

The Best Results.—We may expect the most satisfactory results from breeding for the best types of these two special lines, rather than from a use of grades, or "compromise" horses. It is fortunate where communities can unite in the raising of some special kind of horse. The common interest enables them to secure better breeding stock, a local pride in the project is established, a uniformity of product is obtained, and buyers are enabled to pay better prices when they can find car-load lots of such horses as they want, at a single point, rather than to be compelled to pick them up in different localities.

Feeding and Handling.—In order to attain success in the raising of horses, a recognition of a few general principles of feeding and handling our brood stock and colts is important. The raising of colts has been considered a less certain work than the rearing of the young of our other domestic animals. Especially has the loss of colts at birth, or soon after, been so great in some localities as to render horse breeding unpopular. Believing, as I do, that under proper conditions the colt may be as safely raised as the calf, I wish to consider the importance of proper food and exercise in producing successful results.

Weakness of the Young.—In communities, or in individual cases, where general complaint of weakness of the young has been made, the cause has usually been traced to insufficient or irregular exercise, and a too generous feeding of grain to breeding stock.

Both sire and dam should have abundant exercise, ether given regularly in harness or by their being allowed a free run in a commodious yard. A box stall is insufficient room for exercise. These animals should never be fat. Good hay, straw and wheat bran, should mainly constitute their feed. Corn, corn-meal, barley and molasses, and other corbonaceous food, given to put the animal in good show condition, should be discontenanced, and the breeder should not only see that his brood mares are properly fed and handl-

ed, but should also insist that the sires be similarly treated. Avoid abrupt changes in the feed of the brood mare during the period of gestation, especially a sudden change from dry to green feed in the spring. Under these circumstances, exercise and accustomed food is best continued until after the birth of the colt. It is all important that the colt should be generously provided for, that his growth and development be constant and continuous from birth. The young animal that is early stunted never fully recovers from the ill treatment. If the dam is worked upon the farm, the colt should be allowed to eat grain with its mother.

If allowed to run with the dam until it is five or six months of age, its growth will be much more satisfactory than if weaned younger. Shut in a roomy box stall at weaning time, feed small quantities of fresh wheat bran and oats often, and supply with fresh water and good hay. Do not allow the colt to fall off in condition, When sufficiently weaned, give a run during the day upon fresh pasture, giving shelter during storms and at night, and continue a generous grain ration.

During the first winter the colt may be allowed to eat all the oats and wheat bran of equal parts that it will take, if it be allowed daily exercise in the open air. This combination produces the best quality of bone and muscle. Starvation and exposure are not essential in rendering the coming horse hardy and vigorous.

The Draft-Bred Colt — Should be handled for early maturity. If two and a half years is the limit of profitable feeding of steers for beef, if hogs pay best that are sold at eight or nine months of age, the same practical principle applied to the colt, would put him where the market would want him at from three to four years of age. At this time he should weigh from 1,300 lbs. to 1,400 lbs., and bring from $150.00 to $250.00.

The draft colt is a *horse* upon the farm when three years old, and perfoms his work to the satisfaction of the judicious driver and without detriment to himself.

Improvement of Stock.— In conclusion, allow me to say that while we can profitably raise many more horses than we have been raising in the past, the improvement of the quality of our stock is of first importance. If the 150,000 horses in Wisconsin to-day that weigh less than 1100 lbs., and are of so inferior a quality as to represent a merely nominal value in the market, were, without increase of number, such animals as judicious breeding and intelligent feeding would produce, they would represent an increased valuation greater than the entire estimated annual dairy product of the State; greater than the combined valuation of hogs and sheep upon our farms, and nearly double the amount of our annual beef production.

Demand Increasing.— Year by year the demand for good horses increases. Quality is recognized by increased prices. In common with other farm enterprises the demand is for better work. It requires 250,000 horses annually to supply the Chicago market, and nine out of every ten of these are for work. Horses are to-day doing duty upon our city drays, express wagons, omnibus and street car lines, as well as in our pineries and mining regions, that are unfit for their work from a lack of weight, and they will only be tolerated until better and heavier teams can be obtained to fill their places.

No Danger of Over-Production.— Is there danger of the production of good horses being over-done? When

the prejudice, penuriousness and shiftlessness of the American farmer gives way to opposite qualities, and the best principles of breeding and methods of handling prevail universally, when too many farmers do their work too well for it to be remunerative, this question may be seriously considered.

So long as quality is intelligently and persistently made superior to quantity, with the peculiar advantages of our climate and soil, imparting vigor and producing feeds adapted to the work, the raising of good horses promises as well for the interests of the Wisconsin farmer as any other industry.

Discussion.

MR. URQUHART.—I would like that Mr. True be allowed five minutes to present the merits of the heavy draft horse.

Mr. TRUE.—It seems that that is the only horse which is not presented here, and I wish to say, while I concede what has been claimed for the other classes of horses, and especially the carriage horse, yet I consider the interests of the average farmers of the state of Wisconsin when I champion the heavy draft horse. I have in mind the certainty with which it is raised, and the uniformity of the product, and think that many men who would make a failure should they attempt the raising of the carriage horse, are raising the heavy horses and attaining thereby a degree of prosperity they probably would not in any other similar enterprise. While I am willing to grant all that may be just to the raising of the fancy breeds that are required by the market, still I think that the public mind should not be diverted from the fact that the sure means of making money upon the farm by the average farmer without skill or especial adaptation to his work remains in the production of good heavy horses for the market.

MR. FISH.—As a matter of fact, the farmer will use, as breeders of the farm, the same horses as he uses to do the work. He can't afford to keep two sets. It seems to me to be very necessary in order to increase and improve our horses upon the farm, that we keep none but the best. Consequently my plan would be to keep only the best for breeding purposes, and sell those that we do not consider first class, and in that way, we can, in a few years, very materially improve the horses that we have in this country.

MR. ROGERS.—I have listened to the discussion on the horse question with a good deal of interest, but I have yet to learn from it whether the draft horse business can be made profitable by farmers having small farms. I want to ask Mr. True whether the rearing of draft horses in Wisconsin can be made a specialty so that a farmer on land worth from forty to sixty dollars an acre can buy his dams and his sires and then sell at say $200 a head at three or four years old, and make a success of it without having anything else for the dams to do?

MR. TRUE.—It will be remembered that I addressed myself particularly to the average farmer, and I believe, from my experience and the experience of my neighbors, that, when his farm is adapted to the enterprise, it can be made as profitable as any other branch, at least, of farming. It is a fact that a colt upon a farm is raised as cheaply if not more so than a steer or a heifer of a corresponding age. It is a fact that it requires probably less to feed and to keep the brood mare under the best conditions than it does the milch cow. It is also a fact that heavy horses raised in the State of Wisconsin are worth more to the business to which they are adapted than those that are brought over from Iowa, Illinois or

other States, from the fact that our climate and our methods of feeding are better adapted to the production of good horses. It has been stated to me that the horses in the pineries, coming from the more Southern localities, are much more frequently lost in becoming acclimated than our Northern horses.

THE TROTTING ROADSTER.

By Dr. S. M. BLAKE, Columbia County, Wis.

Third Paper.

The Favorite of Man.—The horse above all domestic animals is the supreme favorite of man. In the toils and pleasures of home life, he is the ever willing, and faithful servant. In the drudgery of the farm and dray, or the "pleasure rides of lovers," he brightens our burdens and adds to our joys. He bears from the country-home to the village church, the worshipping families of our land upon each returning sabbath. He is the ever swift messenger to go for aid when sudden calamity has befallen any of the beloved ones of home, and to the physician he is more than a servant —he is a companion; and when to us the toils and pleasures of life are ended, it is the horse that draws with measured tread the funeral hearse.

Horse Enthusiasts.—When we contemplate his usefulness in civilized life, it does not seem so strange that now and then we find an enthusiast, a man who is "cranky" and "horse crazy" upon his particular favorite, and in calling the attention of Wisconsin farmers to the trotting horse, I am free to confess that he is my favorite, and the one above all others to be perpetuated by the average farmer; for it is from the larger families of trotting horses, that the "general-purpose horse" is to be obtained. The horse

> "That can plow and sow
> And reap and mow,
> Or to the village gayly go,
> And in a race
> Maintain the pace,
> And win with ease and grace."

Eminent Statesmen. — General Grant proved that he was not only a statesman of marked ability, but the greatest military chieftain of his day; Washington was a man of kindred parts; Lincoln could wield an axe, steer a flat boat, write a state paper, and guide the ship of state amid the most perilous times. Each and all were men of comprehensive minds and broad, liberal views. This enabled them to do many things and do them well. They were great, because they met great responsibilities of a varied character, and served well their day and generation.

Selling Value.—When property in man was bought and sold, the selling value of each person depended somewhat upon the variety of work he could accomplish. Apply this principal to horses, and we have our most valuable type in the general-purpose horse; and as I have before stated, it is from the trotting families that he can be found in

greatest perfection, for it was from the common stock of the country that the trotting horse was obtained, as the customs of the people led to the use of the carriage instead of the saddle. The trotting gait being the most graceful one for the carriage, speed at this gait soon began to be developed.

Trials of Speed.—The spirit in man that stimulates him to excel his neighbor, was not long in giving expression through the trotting horse. It has been but about fifty years since this method of testing the powers of the horse has been extensively practiced, and while it must be acknowledged by the friends of the trotting horse, that an opportunity through him has been given to the betting habit among men, and other immoral practices that the baser elements of society are ever ready to improve, yet there are many profitable lessons learned by those who have studied the methods that have been crowned with greatest success.

The Successful Jockey.—One very important lesson, is that the most successful jockey is the one who, through kindness to the horse, has gained his confidence. When this is accomplished, then every nerve and fiber of the confiding horse is subject to the will of his master, and so the driver of the fast trotter is entitled to a large share of the honor; for he must possess a trained mind, a steady nerve, quick perception, and good judgment, and these are elements that improve manhood, and which can only be possessed by persons of approximately correct habits of life.

Superiority of the Mare.—The development of speed in the trotting horse has revealed the fact that superiority is not alone possessed by the male sex of the equine race, as the names of Lady Suffolk, Flora Temple, Goldsmith Maid and Maud S. will attest. These have worn the champion's crown since 1850, most of the time yielding it only for a short time to Dexter, St. Julian, 2:11¾, Rarus and Jay-Eye-See, 2:9¾. At the present time, the record of Maud S., 2:8¾, endows her with the proud title of queen of the trotting turf. Jay-Eye-See, with his record of 2:9¾, earned the title of king of his sex. There is but one second of time to the advantage of the queen, but that is sufficient to prove that the power to lead is not always with "the sterner sex."

Origin of Trotters.—While there are nominally a large number of trotting families in the United States, yet when the subject is fully investigated, it will be found that there are three families that have produced most of our trotters, namely: Messengers, Morgans and pacers. But already I fancy the voice of Huntington is shouting, Bashaw and Clay! and to such call by him and others, I would answer, that were it not for the blood of old Messenger, through the grand-dam of Young Bashaw, the echo to the call would have been the only answer to the name of Bashaw among celebrated trotters; but when this ever potent blood has been reinforced with another rivulet from the great fountain, as in the breeding of Andrew Jackson (whose sire was Young Bashaw, and whose grand-dam was a daughter of Messenger), we come to the paternal head of the justly celebrated Clay family. As no trotters of note descended from Grand Bashaw, except through this son, Young Bashaw, it is both reasonable and just to give the honor to the family that is continually producing trotting speed. I would not detract, or belittle in any way, this great branch of the Messenger family, and in calling attention to the relationship of the Bashaws and Clays to Messenger, I believe myself to be a truer friend to the

family than he who would hide this kinship by the substitution of an Arab. The rivalry and jealousies of breeders, whose minds are so narrowed by selfishness that they can see no good beyond their own barn-yard, have extolled the merits of their own branch, and pointed to defects in others with such magnifying powers that the reader of much that is written on the subject of trotting horses (were he not well posted in pedigrees) would not for a moment think that the Hambletonians, Mambrinos, Abdallahs and Clays were all branches from the same parent stalk—Messenger, the son of English Mambrino, son of Engineer, son of Sampson, son of Blaze, son of Flying Childers, son of the Darby Arabian.

Breeding Problems Solved.—The interest that has been given to this class of farm-husbandry in the last quarter century, has solved many of the breeding problems that previous to this time were clouded in mystery; but the reason for the fact that Messenger should so far excel all other thoroughbreds in the propagation of "trotting instinct" in his progeny is still unanswered, although it is acknowledged by all enlightened horsemen that he stands preeminent above all others, as the most reliable source from which to obtain winners in trotting contests. They are larger sized horses than the average thoroughbred, and being kindly dispositioned, they are rapidly supplying the place of the "gentleman's carriage horse," and at the present time there is perhaps no branch of the Messenger family that is so much sought after as the Mambrino Chiefs, to fill this demand; and while they have proved upon many a well contested field that they are dangerous rivals of the best in speed qualities, they are on an average larger than any other family of trotting horses. This is a very important consideration for the average farmer, for if you breed from representatives of this family, your chance to obtain extreme speed is just about as good as from any other source, and the prospect for obtaining a horse large enough to do any kind of work is increased by the same ratio that they are larger than other families.

Noted Trotters.—Among the noted ones of this family may be named, Lady Thorn, 2:18¼; Woodford Mambrino, 2:21½, and four other sons and daughters in the 2:30 list; besides, he has 22 sons who have 71 sons and daughters that have records below 2:30. Of this number, Mambrino Patchen has 13 and Woodford Mambrino has 11. The dams of Almont, who has 33 of his progeny in the 2:30 list, and Piedmont, whose record is 2:17¼, Administrator, 2:29½, Almont Eagle, 2:27, Allie West, 2:25, Alpha, 2:25½, Dainty, 2:26¾ Director, 2:17, Ella Clay, 2:27, and ten others whose progeny have records between 2:26½ and 2:21, are all the daughters of Mambrino Chief. These figures are obtained from the records of 1885, which are doubtless changed greatly to their advantage at the present time, as Almont alone has added six to the 2:30 class during the last three years.

The Mambrino Chiefs.—I would call especial attention to these facts, for the reason that the farmer who keeps but one span of horses should know where to improve the size of the roadster and general-purpose class, and not lose in quality in any respect that firmness of muscle, density of bone, intelligence of brain and nerves of steel, all of which are possessed by the trotting families, and which it has taken generations to establish. For this purpose, there is no branch of the Messenger family that will rank equal to the Mambrino Chiefs.

The Morgans—Occupy the other extreme, being the smallest of all families of trotting horses; but when beauty of form, soundness of constitution, docility of temper, endurance, longevity and general usefulness are taken into account, they have no superiors. It has become proverbial that any person who has once owned a typical Morgan and worn him out, is never quite satisfied with any other kind of a horse.

Celebrated Horses.—The Blackhawks, Knoxs, Marrillos, Fearnaughts Ethan Allens, Daniel Lamberts, Golddusts, Flying Clouds, Herods, Ripan Boys, and many others of but little less fame, are representatives of this family, and their records upon the trotting turf prove them to be nearly the equal of the best. In the 2:30 list are found 308 Morgans that trace in the direct male line to Justin Morgan that have trotted 2,853 heats in 2:30 and better; 2:16¼ is the fastest heat, by Lucille Golddust, that we find accredited to Morgans, but in looking over the blood lines of such celebrities as Rarus and Jay-Eye-See, we find they, too, have a dash of Morgan blood through their grand-dams. But the greatest sensation of the year among horsemen, is the announcement by Joseph Battell, that he has the evidence which proves that Old Canadian Pilot was a son of the Hawkins horse, the son of Justin Morgan. Accepting this revelation as a fact, and it is no longer a mystery (to those who know the marked intelligence of the Morgans, together with their vital stamina) why the blood of Pilot Jr. was so potent, when mingled with the hot blood of the thoroughbred; that the horse possessing these two antagonistic tendencies was so easily persuaded to abandon the gallop and stick to the trot until the last competitor was left in the rear—for it is the compound blood of Hambletonian Pilot, Jr., and the thoroughbred that courses proudly through the veins of the king and queen of the trotting turf.

Pacers.—Just where they originated I shall not attempt to tell, but in the statuary of ancient Greece is found the likeness of the pacer, and historians have occasionally referred to them as being among the horses of England in an early day. But in later times the thoroughbred overshadowed him, and he ranked as plebian while the thoroughbred was the patrician. In the early settlement of our country, however when horseback riding was the only ated, and became very common in the Eastern States, and as a result at the present time there is an admixture of his blood in the common stock of the country, and especially so in those States where horseback riding is most prevalent. So when the pedigrees of celebrated trotters began to be studied, it was so often found that in them was mingled the blood of the pacer, that he soon began to be tolerated as a factor in the American trotting horse; and at the present time the breeder who wishes to obtain a phenomenal trotter, will, through the light of the last quarter of a century, be careful to secure a strong infusion of the blood of the once despised plebian pacer. The pacing stallion Blue Bull ranks first as trotting-sire, having more 2:30 performers than any other horse. The two most celebrated trotters of 1886, Harry Wilkes, that defeated Phallas in a matched race, and Manzaniter, the California four-year-old, that was able to defeat the best of the age at St. Louis, in the unprecedented time of 2:15, 2:17, and 2:16½ in three heats, are each amalgams of Hambletonian, Clay and pacer. The dams of each are pacing bred. It is claimed by some that four of the entire sons of Justin Morgan inherited pacing

elements from their dams, thus making it necessary to divide the honors that have been given to Messengers and Morgans in trotting victories with the pacer—the horse that came from no one knowns where; but all are quite certain that he is going to "get there."

Profit in Breeding Roadsters.—There is a vast amount of capital invested in breeding-farms all over the country, and there is no class of farm industry that is more certain to yield a good profit than the raising of stylish, fast roadsters, and the roadster and the trotter are the same animal. Size, style, substance, speed, and fashionable breeding are the essentials that the market demands.

Success Attained.—There is, perhaps, no branch of stock raising that requires so much knowledge of nature's laws, and so great wisdom in the adaptation of means to an end, as the producing of this class of horses; but I assure you that it is possible for some to attain success that is not surpassed by any other kind of farm enterprise. I have but to present the following figures of the Glenview sale in October, 1886:

Five stallions sold for	$63,900 00
Ninety-four brood mares sold for	157,740.00
Forty-one colts sold for	67,600.00
Forty-three fillies sold for	53,585 00
Four geldings sold for	1,115.75
The average price for stallions was	$12,780.00
The average price for brood mares was	1,678.00
The average price for colts was	1,500.00
The average price for fillies was	1,240.50
The average price for geldings was	278.75

To these figures may be added $50,000 that has been offered, and refused, for some of the best individual trotters, proving conclusively that their worth is greater than any other class of horses.

The Horse for the Farmer.—But it is not expected that the average farmer will make this branch of husbandry a specialty, neither is it advisable for him to do so, as the training and developing of the horse for speed purposes is the most unpromising business that could enlist the energies of the common farmer; but this type of horses makes the very best general-purpose horse, the family carriage horse, the fleet roadster —"where time is money,"—the livery horse, and the horse that will do all kinds of farm work, when used from colthood for such purpose, with a fitness, when all the demands of the farm are considered, that is not equaled by any other class of horses. This statement is based upon the fact that he is the most highly cultured horse in the land. He is under as perfect control when at extreme speed as when walking; his enduring qualities are surpassed by none, and equaled only by the thoroughbred; in longevity he surpasses all, and being of medium size, he is graceful in motion, beautiful in form, and distinctively American.

The American Trotter.—In no other country can the equal be found of the American trotter, and the man who has a well matched pair of fashionably bred horses of this stock, of about 1,200 lbs. weight, will be able to move loads of as great weight as economy would dictate, for is there not wisdom in the old New England maxim: "Light loads and go often, whole carts and fat oxen." The inherited qualities of the trotting bred horse qualify him for so many different places that the opportunities for sale are much greater than if his capacities fitted him for one kind of work only, and especially is this true when a good medium sized mare is to be judged. Besides the observing breeder will soon find that there is much less danger of loss in rearing the young from medium sized stock, than from the over-grown families.

Breed to a Purpose.—It is important that the breeder of horses should know all that can be known of the laws

of heredity, for it is by conformity with nature's laws that the "ideal horse" is to be obtained. Scientific breeding consists in uniting the strength of inherited tendencies upon one definite purpose; and rejecting all that is antagonistic—the breeder should look well to the condition of the parent, on both sides, for they can only reproduce that which they possess. So if you wish a draft horse, breed to the best representatives of sire and dam of that class, or if you want a runner whose breeding entitles you to expect a winner, breed from the running winners; but if you want a horse that will ever be the universal favorite in our country, breed to that family of trotters that possess most of the qualities you desire.

With all due respect for the Scotchman who loves his Clydesdale, the Frenchman his Norman, or the Englishman his thoroughbred, the patriotic pride and joy of the American will ever dwell with the American Trotting Roadster.

BREEDING TROTTING HORSES.

By SEYMOUR BROOKS, Walworth County, Wis.

Fourth Paper.

Like Begets Like.—There are certain essential rules to be observed in successful breeding of animals which have been formulated by experience and observation.

Those breeders who have succeeded in producing the best types of the breeds have been the deep thinkers and most careful students of heredity. It has become an acknowledged axiom in breeding that like begets like; that the offspring will resemble the parents, or some remote ancestor, which gives the breeder a foundation on which to build.

Well Established Breeds. — We have to-day a number of well established breeds of horses that have been bred in line for a good many years, all good and well adapted for some special use. Which of all these good breeds shall engage our individual attention is a point for each breeder to decide for himself.

The Horses to Breed.—The kind of horses we like best, generally speaking will be the ones for us to breed; we will be more interested in them, and derive more pleasure and satisfaction in careing for them. It will not be irksome for us to be with them because we like them. Which of all the breeds will best do my work, and the surplus command a good price in my market? In determining this question, there are some local considerations not to be overlooked. If there is some well established breed that greatly predominates in your vicinity, that fact itself will bring purchasers for that particular kind of a horse, make a market for him right at your door, and greatly facilitate your chances of sale. If this be the case go in with your neighborhood and help to make it famous for that breed. The greater number of good horses you can

group together in one neighborhood, the sharper will be the competition for them. It will call buyers from a distance, knowing the fact that they can be obtained by the carload. Another factor will be that a choice of stallions will be kept there, making it more convenient in breeding your mares to your special kind of horse. Other things being equal, I believe a man had better breed the horses he likes best. He will derive more pleasure from his favorites and make a more skilful breeder, if he follows the bent of his inclination. We are made up that way, and we can't help it.

The American Trotter.—If there are any gentlemen present who have not fully decided what kind of a horse to breed, and are waiting for more light on the subject, allow me to put in my plea for my favorite, which is the American trotting horse. In so doing, I do not antagonize any other breed; nor am I here to champion any particular family of trotting blood. A combination of Hambletonian, Mambrino Chief, the Clays and Morgans, so intermingled as to produce a horse that will weigh twelve or thirteen hundred pounds, is my ideal of a horse—one that I have thought much about, and labored many years to produce, with what success you will learn farther on. Do not get the idea that I am going to champion the track horse, and advise farmers to breed him. I leave that part of the subject for Mr. McKinney, who will, no doubt, do it justice. It is the larger part of the breed to which I wish to call your attention—horses that have plenty of bone and muscle to do any farm work with ease; that have the courage not to be outdone in a hard day's work on the farm, or a long drive on the road; that have the brain that is susceptible of being educated into a companion for man, his most willing and faithful servant, the peer of all animal creation, the best gift of a divine father to his children. I do not wonder the Arab loved best, next to his creator, his favorite horse.

Breeding the Dam.— How shall we breed this kind of a horse? If we build on a sure foundation, we must make the dam the chief corner-stone. A mistake here is fatal to the whole building. Any defect in the material used in the foundation lessens the value of the whole building. You may use the best material in the upper stories, still the building will be defective. So, also, if there is any defect in the dam, a lack of size or color, a bad disposition, any weakness of bone or tendons, want of a vigorous constitution, in short, any defect, it condems her as a foundation on which to rear an ideal horse. If her disposition is bad, reject her, for her progeny will be like her. The dam gives the temperament, the sire the conformation. When you find one all right in conformation, disposition, size and breeding, do not let a few dollars stand in the way of your being the owner of her. If she is a regular breeder, she will pay you better than a government bond worth one thousand dollars. I say this from my own experience. Having obtained her, consider her too much of a treasure to part with.

Breeding the Sire.— We are now ready to go to horse breeding on the dam's side. What kind of a sire is fit to mate with this mare? I will first name some I would not use, and then describe one I would. I would not use a small, fine-boned horse, although he had the speed of a Patron or a Harry Wilkes. There are too many blanks in breeding expressly for speed. Leave that to those breeders who can afford to take the chances. If we breed a small horse, and he fails to go fast, his market

value will be diminished in proportion to his size. In breeding for large horses, enough of them will be small to supply the market for small horses. Let us aim to breed horses that will tip the beam at 1200 lbs,; sixty-four inches high, with heavy flowing mane and tail, which is an ornament to the carriage horse that will be appreciated by the purchaser. A pair of carriage horses that is deficient in this respect will not sell for a large price Do not breed to a horse with pig's eyes sunk into his head, and narrow between them. He will lack intelligence—a stupid brute. Avoid dull color, rough coat, small, shelly feet. "No foot, no horse."

My Ideal Stallion—Is a horse that will weigh from twelve to thirteen hundred pounds; bay brown or black; bright, soft coated, indicative of thrift; large brilliant eye that looks clever, and intel ligent; strong muscular development; back short and slightly arched; rump long and level; round barrel; sprung ribs; fullness of chest; resolute head; long, oblique shoulders; heavy arms and thighs; strong, bony limbs; great length from hip to hock, short from hock to pastern; black, round feet—one whose ancestors down both sides were like him, bred in line with no out-crosses from trotting families. We will breed our mare to such a horse, believing we have started right in breeding on a good foundation, with an expectation of success.

I would have the dam perform some kind of service while carrying the foal, and feed one part bran, three parts oats. These phosphates will furnish, through the dam, bone and muscle forming food. Wean the colt at five months old.

Raising the Colt.—If you have good pasture, water and shade, that is sufficient. If not, supplement with wheat bran and oats, half and half. Arrange the feed box so that the colt can eat with his dam. At weaning time, tie the mare in a box stall; put a halter on the colt and tie him by her side. That will be satisfactory to both of them. Let loose the colt three times a day, to nurse, for a few days. Do not give the dam much water; it will help to dry her milk. Keep a pail of water before the colt, also bran and oats. In about four days take the mare away and put her to work. Our colt should now be in good flesh. Let us aim to keep him so. It can be done with feed. Different colts will need different amounts. Do not be afraid of feeding too much; it will not hurt him. American Eclipse was fed six quarts of oats the first winter, and it did not hurt him. Do not get the idea that because you are feeding the colt all the hay he can eat, you are doing for him all you can. A colt's stomach is small and does not need much hay. What he wants is concentrated food, rich in phosphates, to build up the bones and tendons. Oats and wheat bran contain the elements needed, with a little hay to distend the bowels. Give him liberty, in a small yard, during the day.

Educating the Colt.—When the colt arises, go up to him, put your left hand under his neck, your right hand around his hips. Hold him still; he will be afraid and struggle some, but you can hold him. He will soon quit struggling and look at you. Pat and rub him; he will like it. Keep hold of him until all fear is gone; then let him loose and he will probably follow you. Do this several times a day for a few days, and he will expect to be fondled when you come, and pleasant relations will be established between you. Have a little lump of sugar in your pocket for him; he will like it and come to you for his sugar. Pick up his fore feet, rub and pat him (do not forget the sugar).

We left him tied in the box stall. What are we going to do next? I should go in there alone, taking a rope along with me about 20 feet long. Now, find the middle of it, and put the loop end over his hips, down in the curve of the stifle. Tie a knot where the neck sets on the shoulder; put each end on either side of his neck and both ends through the ring of his halter. Untie him and lead him out, which you can do about as well as you did his mother. He will not pull back much; neither can he rear up and fall over backwards, as they do sometimes, striking their heads on the ground, which is very dangerous. Give him a couple of lessons in this way; then tie one end of the cord around his neck, put a loop in his mouth and you have perfect control of him. Stand a little way from him and tell him to come. Of course he does not know what it means. Twitch the rope a little. It hurts, and he will come up to you. Step off again and repeat, and you will teach him very soon to come by the word without pulling on the cord. One thing more should be taught him while the rope is in his mouth; the most important point in colt breaking, and which needs to be followed up to horse-hood—the word whoa. Give him to understand that when he hears that word it means implicit obedience. Speak the word; at the same time give him a twitch on the rope. Repeat until he minds the word without the cord. This preliminary work faithfully done, harnessing and and driving will be mere pastime. My excuse for consuming so much time in colt breaking is that a high spirited colt spoiled by education becomes a worthless brute, and the fault lies at the door of the teacher.

When to Sell.—Any time you are offered a good price. Do not wait to get the last dollar in them. Give the buyer a chance to make something on them.

Where to Market.—At home; the buyers will look you up. Sell one to your doctor, if you live some distance from town, so that he can get to you at a lively gait if occasion requires; it will be a walking advertisement. Sell one to your minister; it will make him a better preacher. When Henry Ward Beecher wanted to draw on his intellect to its fullest extent, he used to take a drive with Mr. Bonner, behind his fliers. That gave him the inspiration. When business or pleasure calls you on the road, harness them tastefully, and if the road will permit let them step along at a lively gait. They will enjoy it, and so will you. If there be a piece of smooth road, cut them loose for a half mile or so. You will be too busy holding them level to notice a second party as much interested as you are, and there will be some talking in town that night which concerns your horses, and buyers will come around, providing you have the goods they are looking for. Do not be too greedy in price; give the middle-man a chance to make something. If you are dealing with a party who wants them for his own use, you can add the price of the middle-man's profits.

Will it Pay.—I know of no better way of turning hay, oats and grass into money. Previous to the year 1883, a good flock of sheep paid me the best. Since then my horses have come to the front. I breed Durham cattle, Merino sheep and the kind of horses I have tried to describe. My income is derived from this source. While I have not become a bloated bond-holder, yet with the help of these animals, and a kind providence, I have bucked the mortgage off the farm. I am well satisfied with the results of my horse breeding; they have

paid well in dollars and cents, and I have derived a great deal of pleasure and satisfaction in watching their development. In breeding this kind of a horse, you are liable to get speed enough in some of them to make them command a long price. Sell those (if not your best fillies), for they are dangerous property for the average man to own. They are apt to turn his head and spoil the boys. Be satisfied to breed them; let the other fellow sport with them. They will all be good road horses. Good farm horses will fill more places well than any other breed that I know of. While I have not been breeding for speed, considerable has cropped out. I bred St. Albans, with a record of 2:20¼, Western Boy, 2:26, and a good many that could beat three minutes. The first two named were large enough to draw a reaper or a heavy family carriage, but their gait was so rapid that they were promoted from a Wisconsin farm to draw the family carrige of a New York City millioniare at a cost of $4,000. I did not get that, but I got all I asked, and ought to be satisfied.

Recapitulation.— Breed only from large, sound, well formed mares, good color and disposition. Breed in line from standard-bred stallions. Keep in mind the laws of heredity; remember, the colt generally takes its disposition from the dam, the conformation from the sire. Use a sire that has size, form, substance and breeding. If he is a fast, gamy trotter, so much the better; it shows strength, will and constitution. Feed the colts bone and muscle-forming food in sufficient quantity to keep them growing; never let them go backwards or stand still. Last but not least, carefully educate them; this will not be done unless the groom has some good horse sense. Be mild, gentle, yet firm. Speak to them in a low tone; they are quick to hear, and will try to please you when they know what you want. Exercise at least as much patience with them as you would with a dull boy, and they will be just as apt scholars. Reward them for good behavior by patting them and calling them good fellows. Remember they have got a will of their own; do not try to break it. Your business is to turn it in the right direction; teach them to use it in finding the end of the road, in disdaining to travel in the other horses' dust. Utilized in this way, it becomes a cardinal virtue. Turned in the wrong direction, it becomes an unmitigated vice.

THE CONFORMATION OF THE HORSE.

By V. T. ATKINSON, V. S., Milwaukee, Wis.

Fifth Paper.

The Perfect Horse.—When first asked to address this audience by Supt. Morrison, I supposed that I was intended to do something of the same kind of work that we are doing at the institutes. He asked me to give a talk on the conformation of the horse, and to illustrate it by the use of this model. Now, I find there are a good many people who have come here more to see the model than

to hear me talk. Perhaps it will be well to consider the conformation of a perfect horse. The horse that I will outline may not be your ideal horse. We differ in our tastes on horses as much as on other things. I will just run over the outline of a perfect horse, according to my idea. Of course, proportion and graceful outline go for a good deal.

Points.—In looking for an animal approaching perfection, we expect to find the head not too large in proportion, the forehead broad and flat. The brain is situated in the cavity beneath, and the space between the eyes is indicative of storeroom above—the position which the brain occupies. The eye is lively and full of fire, the face straight, the nostril wide, the lips thin, the ear firm. The muscles on the sides of the cheek are well developed; these are the engines that carry on the first process of digestion—mastication; they are the grinding stones that crush the food. Running back, the neck should be curved above, straight on the line below, widening gradually toward the body, and not too full toward the head. We find, sometimes, necks looking as if they were put on wrong side up; what we call a yoe-necked animal, not a pretty thing. Then we find the opposite of that, what we call a bull-neck, anything but beautiful. Passing backward, the front legs should run in a straight line down from the body; the two feet should approach each other slightly, looked at from in front. The shoulder should suit the purpose for which the animal is intended. If for speed it should be flat. If for draft it should be upright. The front legs are the carrying power of the animal. They are the parts on which the animal's weight rests mainly, while the hind legs force the animal forward over the ground. The feet should be a little nearer the center of gravity. Looking at the leg sidewise, the arm below should be long in proportion to the parts below the knee, the whole limb descending in a straight line from the shoulder.

A low down knee is desirable in a horse, enabling the animal to make a long stride more quickly than when the knee is set high up. Speaking in general, a rough joint, as a rule, is a good joint, not one that is smooth where the interstices between the bones are filled in by what we call false tissues, that which is called a gummy joint. The knee and fetlock should be large, broad in front and distinctly marked with bony prominences. The fetlock should slant to an angle of about 45 degrees, running down to the hoof.

The foot on its ground surface should be round, and in size proportionate to its owner. The line of the front wall should be parallel to the centre of the pastern and at an angle of about 45 degrees with the sole.

In considering the body, see to it that there is room enough for the lungs and digestive apparatus.

The breast should be prominent. The ribs should stand out with sufficient curve to afford space enough within. The back should be straight and not too long; the loins wide and flanks full. The tail should be set on at the right place, for it is impossible to have a good appearing horse unless he have two good ends. The hips and quarters should be well muscled and strong. The stifles should project boldly forward and have a perceptible irregularity of surface. The thigh should be muscular, thick and proportionately long; the hock wide from before backwards; rough and prominent. Its front should stand straight backwards, and when viewed from the side it should not have too much curve.

Appreciating the shortness of the

time allotted to this talk, I have run over these points very rapidly. In order that what I have said may be fully understood, I will now make a rapid dissection of this model which is the one used to illustrate the course in veterinary science at the university. It can be so detached and arranged as to show over three thousand anatomical parts. (The doctor then dissected the model completely and briefly explained each part.) If there is anything farther you desire to know, please ask questions.

Discussion.

MR. SLOAN.—Doctor, I have seen it stated somewhere that the cannon bone of the draft horse is light and porous, while the cannon bone of the thoroughbred is like steel. Has any actual scientific investigation been made by the microscope or otherwise, so that we can know whether there is any difference in the composition of the bones of the leg of the thoroughbred horse and the draft horse?

DR. ATKINSON.—Nature has arranged that the different bones shall be made to suit the peculiar requirements of the animal. The bone is made up of two different styles of tissues. There is the compact or denser element, and the cancellated. If you make a section of the cannon bone of a deer, then make a section of the cannon bone of an elephant, you will find a great difference in the structure of the two bones. You find on the deer's leg a very heavy layer of hard tissue on the outside, and the softer structure much less in proportion. In the elephant you find only a trace of the compact tissue. If you will take a cross section of the leg of a race horse that has been bred continually so for many years, and then a similar section of the leg of a heavy draft horse, you will find the same kind of tissue in each but a larger amount of cancellated or soft tissue in the larger horse's bone than in the small one's, while the smaller bone would be likely to have more of the compact or hard tissue.

MR. URQUHART.—I have not noticed in the paper what this gentleman speaks of, and also they claim that the feeding makes the difference. The draft horse being fed corn, it didn't have a tendency to make the muscles of a race horse. I would like to know about that.

DR. ATKINSON.—Prof. Henry could answer you on that subject more ably than I. Of course, the animal is influenced by all the surrounding influences, and has inherited some peculiar attributes. Exactly how much can be done by feeding has not yet been demonstrated. I think there is no person to-day, who knows much more about feeding than Prof. Henry does.

PROF. HENRY.—Mr. Chairman, within a week, assisted by Dr. Atkinson and Mr. Theodore Louis and our short course class of students, we weighed the bones of animals fed differently, and I would say that the thigh bones of a pig fed exclusively corn, stood a strain of 170 lbs. pressure, in order to crush it, for each 100 lbs. weight, while that of a hog fed upon shorts stood 270 lbs. pressure, a difference of over fifty per cent., and that difference was brought about by feeding exclusively corn for ninety-eight days in one case, and shorts and corn in the other. We have repeated it again and again and always come out the same way, and I think it is fair to infer that the feed did make the difference.

GEN. PARKINSON.—Doctor, I would like you to explain to this audience with your model, what is curb, and what produces it.

DR. ATKINSON.—The ligament at the back part of the hock is likely to be

strained. When an animal is subjected to a severe strain, or in attempting to make a long leap, or is thrown violently back upon its haunches, a great deal of stress is thrown there, and this ligament is liable to strain or partial rupture of some of its fibres. When that occurs it is followed by swelling, inflammation and tenderness. It is liable to recur if the joint is of faulty construction. Generally when it first occurs, it can be gotten rid of, but if it returns it is more difficult to get rid of.

MR. STRUPE.—Can it be made as strong?

DR. ATKINSON.—That depends upon the shape of the hock. As a rule it is not possible to make a joint stronger than it was in its first natural condition.

MR. PHILLIPS.—We lost in our section a very valuable horse, and the cause given was this: He had been fed concentrated food, oats, etc., through the early part of the season; in the after part of the season they let him eat all the clover he could, which distended his stomach to such an extent that it caused his death. Now, it is important for the farmers to know if a change of food can have that effect. One veterinary surgeon said he had eaten so much that it burst his stomach; another said that when he fell it burst his stomach. Please give us a little light.

DR. ATKINSON.—You can understand why I should hesitate to criticise the opinion of another veterinary surgeon. Of course, sudden, violent changes are always objectionable. Rupture of the stomach does sometimes occur; the stomach of a horse is very small.

MR. URQUHART.—I want to ask about the hoof of the horse. Do you think it is necessary to keep the frog in a healthy growing state, to keep the foot from contracting?

DR. ATKINSON.—The foot is complete as nature made it, and adapted exactly the conditions in which nature placed the animal; that is, the foot will grow just about rapidly enough to keep in a healthy condition when the animal is running on pasture, when the foot is wet every morning by the dew on the grass and when the animal goes to drink. The frog is as essential to the well being of the foot as any other part. When you place an animal on what we call good roads, good as far as the rider is concerned, but not so far as the foot is concerned, if you neglect the frog or allow it to contract, it will press in on the soft part of the foot, pressing in on the cartilages, and injure the little arteries so that free blood passes down through the sole and forms what is called a corn.

The frog should be cared for in some way; exactly in what way depends on the surrounding circumstances. I have seen draft horses that couldn't stand up without their shoes on. The frog had been neglected so long and would grow so full, that if you took the shoes off the whole weight would be thrown on the frog and the pain would be so great that he would not stand.

QUESTION.—Do you think it wise to have the shoe bear on all parts of the horse's foot, or would you spring the heels?

DR. ATKINSON.—In preparing the hoof for the shoe, it should be made perfectly level. Then the shoe should be made to fit the foot, and be allowed to press equally on all parts. If you attempt to spring it up, in springing back, by striking, it is apt to do more harm than good

MR. FISH.—Do you consider the general practice of trimming the frog by horse-shoers, detrimental or dangerous?

DR. ATKINSON.—I must answer that again by saying that it depends largely

upon the condition of the frog. If the frog is healthy and soft, let it alone; if it is unhealthy, of course you must trim it. As a rule, the foot should be prepared, made perfectly level on its lower surface, then the sole cleaned out, and all the dead parts of the hoof taken from it. After you have gone through the dead part, don't take any more. You should not cut it down until you can put your thumb on and feel it spring under it. It is too thin when it is that far along. The frog, if it is healthy, should simply be cleaned off on the outside.

MR. BROWN.—What would be the effect of a hot shoe?

DR. ATKINSON.—The first requisite is that the shoe should be made to fit the foot, not the foot to fit the shoe, and it should bear equally on all parts of the foot. If the horse-shoer, in order to make a perfect fit, heats his shoe and applies it just until it smokes, and then trims off until it will fit, it is not objectionable. There is another way, but I never knew of a horse-shoer that would do it. If he would put his shoe into a box of chalk and then put it on, he could see just as well as if he burns it on. If he allows that hot shoe to remain on until the animal flinches, he has done a great deal of harm. The heat should not be permitted near the delicate tissues above. If it is, it is liable to be followed by the conditions of any burn. You are liable to have the whole sole sluff off.

MR. BENDER.—Can you tell us about the disease known as ring-bone?

DR. ATKINSON.—The middle joint of the pastern is generally the seat of the ring-bone. First it is simply an inflammation of the joint; then a deposit of bone is thrown out, and if that condition continues, the two bones unite into one. After the bone has begun to form into a ring-bone, the animal never can be cured, that is, restored to its former condition, but the other joint can perform the work if the union of the two bones which constituue the diseased joint be complete so that the joint is obliterated.

MR. LOCKWOOD.—Isn't it better for the general farm horse not to be shod at all?

DR. ATKINSON.—Well, the experience of all people, of all times, has been that the horse should be shod. There are conditions under which the ordinary farm horse may be kept without shoes, but if they are going to be used at all on the road, you are liable to have trouble: The structure of the foot won't grow rapidly enough to compensate for the wear of common use.

QUESTION.—We want to know about "founder" of the horse.

DR. ATKINSON.—This desease is perhaps the most painful one that a horse is heir to, and generally results either from chill or over-exertion. It attacks what we call the sensitive laminæ—the structure by which the sensitive and insensitive parts of the foot are united—and they become inflamed, and it is as if there were an acute inflamation and something put on and pressed against it. The peculiar position which the animal takes in traveling has led to error. The animal tries to get the weight off the laminæ as much as possible. If he can get his weight back on his heels, he will get some relief, and in endeavoring to do that he keeps his feet well out in front of him—so far in front that he has the appearance of having a sunken chest. The shoulders are thrown forward on the side of the chest and the feet away out. There is no disease of the chest in the disease called founder.

QUESTION.—What means would you propose to help that disease?

DR. ATKINSON.—The inflammation must be allayed. There is quite a long course of treatment. The simplest one is what is lately known as the American, and is to give the animal half an ounce of saltpetre, nitrate of potash, every three hours until he gets relief. I do not think bleeding of the toe should be practiced until diffusion of the blood is likely to take place. The foot should be kept cooled as much as possible by the application of cold water. If the inflammation is continued three or four days you are liable to have effusion take place between the sensitive and unsensitive laminæ, and separation of these parts.

PROF. HENRY.—I see there are many here who would like to know more on these subjects, and I suggest these farmers send their boys up next winter to hear Dr. Atkinson talk about them.

DAIRY SESSION—MARCH 29.

WHAT COW DOES THE DAIRYMAN NEED?

By Hon. W. D. HOARD, Ft. Atkinson, Wis.

First Paper.

H. C. ADAMS in the Chair.

Two Types of Cattle.—I am restricted to twenty minutes, and the cow is over six thousand years long. To condense this question into so short a statement, is a work which I shall be unable to accomplish; therefore, I will jump into the middle of it at once: Behind me you see hung two crayon sketches of two distinctive characters of cattle—on the left the Jersey cow Matilda 4th, that has made in one year more than her weight in butter, or over nine hundred pounds; on the right, a Hereford cow. Both are drawn from photographs.

Form Everything to Purpose.—Now, the question comes practically to the farmer and the dairyman, seeing these two machines, and observing differences of shape, why is it that with universal agreement, one machine takes one shape and the other machine takes the other shape? It may be answered, "why is it that a sewing machine is different from a reaping machine or a threshing machine? I repeated to you last night the remark of El Hassen about the horse, that "form is everything to purpose;" and if I could get the farmers of Wisconsin to indelibly burn that simple statement into their minds, I would put in their posession the key to all their future success in the handling of farm animals.

Temperament.—I base, in my studies, the dairy function in cattle upon temperament, and temperament produces form. I stand before you to-day a man of nervous-bilious temperament, and men of my temperament almost universally are of like form and characteristics.

Another man stands before you with a short neck, short, thick fingers, heavy jowl, and fleshy build and he is the product of the lymphatic temperament. Now, temperament shapes form, and form shapes function. The race horse in horses, the fine wool sheep in sheep, the hunting dog in dogs, and the dairy cow in cattle, are the products essentially of the nervous temperament.

The bull-dog in dogs, the draft horse in horses, and the beef animal in cattle are essentially the product of the lymphatic temperament. So you see that by first going back physiologically to the beginning of things, and taking temperament to build upon, you have a start by which you can determine the reason

why function swings one way or the other. Then, carry that out right practically a little farther, and you will see that if you breed for the dairy you must breed to temperament, if you breed for beef, you must breed to temperament, if you breed for draft, you must breed to temperament, and if you breed for speed, you must breed to temperament. Consequently, the man who would cross the animal of one temperament with an animal of another, would simply be making hash of temperaments, cutting them up, putting two warring temperaments together, and he would have no results, or, at best, contradicting results of function in the animal. Why not go back and reason in these things physiologically?

Laws of Heredity.—The mischief with our farmers is this: They have no clear understanding of the laws of heredity. I heard a man stand up in an institute and say he commenced with Shropshires, then crossed to Merinoes and then back to something else, and he said: "I haven't a sheep worth a continental." He made hash.

Heredity is the line of descent in the parents. People look at their children and wonder why they are so much unlike themselves. They are not the only parents of the child, they are the last parents; that is all. The child has thousands of parents, and it is the antecedent parentage of the child that marks its character a thousand times more than the last parentage. This we call heredity.

A few men have been intelligent enough in this world to adhere strictly and closely in a physiological sense to the laws of heredity. Think for a moment of the value and power of heredity. Take it in dogs. Here stands a fox hound, the product of one heredity; here stands a bird dog, the product of another heredity; each dog is bred essentially for a certain power, to run and smell. The bird dog, with a nose as sharp as the fox hound's, will cross a dozen fox tracks and never know it, because his heredity is not in that line, and his discernments do not answer to that purpose; but the moment he strikes a bird's track, every single muscle in him is stiffened, and you see the whole answer of the hundred years of breeding in the attitude of that dog. The fox hound crosses a dozen bird tracks and never knows it. The moment he strikes a fox track, up goes his nose and out comes the deep mouthed assertion: "I have found it, I have found it." Found what, Mr. Fox-hound? "Found that for which I was bred to find."

Is there a boy in Dane County to-day foolish enough to go hunting birds with a bull-dog? No, but his daddy will hunt for butter with a beef animal.

When we, as farmers dealing with these animals, refuse to be wise, and fructify our intellect with this knowledge and judgment, then we stand in our own light, and deserve nothing better than what many of us get. We all need the light that comes from thinking and from knowledge.

Physiological Law of Form.—I will spend a few moments in giving you what, in my judgment, is a distinctive physiological law of form, and try and give you a physiological answer for every point that I believe applies to the dairy cow.

Beef and Dairy Forms.—You discover the difference in outline between these two animals. Here is a square block, or a parallelogram, with legs at each corner. This is the beef form. Remember at the start that this other animal is a mother, and clear down through the whole of your reasoning and studying, above any breeding, feeding or handling, must this one question

of motherhood stand with the hand on the throttle all the time. She is the type of bovine motherhood. The beef cow is the type of the miser. The dairy cow takes food and gives off lavishly and liberally each day, another form and amount of food. The beef cow takes the food and stores it up and refuses to surrender it until placed on the block. For this purpose we have this form, and for the dairy purpose this other form, and these questions of form generally lie at the bottom of functional performance.

The Motherhood Type.— Now, the motherhood type is almost universally formed and built in the nervous type of character; large expression of motherhood function comes from that form of build. On the beef side of the house, we have a bullock of the feminine gender, and consequently this animal surrenders motherhood in the breeding of her young and breeds for the bullock type.

The General-Purpose Cow.— She cannot help the issue, and if the dairymen of to-day who are clamoring for a general-purpose cow would stop and think what a general-purpose cow is, they would see that such a cow must be bred from beef lines to get size, and size means extra cost for the support of the frame that they don't want, in order to get a little milk that they do want. Therefore, it is not an economical build.

The Nervous Temperament.—The nervous temperament invariably produces, I said to you, a certain form of construction. What do I mean by nervous temperament. Men and animals are divided, men particularly, into nervous lymphatic, bilious and sanguine, four basic temperaments. Then, we have the combinations, nervous-bilious, nervo-lymphatic and so on.

But with animals we are building for specific results, reaching into the future all the time, not building for to-day or for the present.

Take myself, for instance. I am a man of nervous-bilious temperament—I don't mean nerveless. People misunderstand this word "nervous." They think it means excitable, fearful, timid; nothing of the kind. See how you contradict it yourself when you say a man is a man of nerve. Do you mean he is nervous in your sense; you mean a man who has nervous power sufficient to control his nerves, not muscular power, because the nervous system lies at the bottom of all systems in physiology.

You can't fatten a man like me, and it is just the same with this cow. By virtue of temperament, food must be expended in certain lines of force, not in accumulations of flesh.

The nervous temperament in dairy cattle starts in the brain; the brain is the seat of all temperaments, but particularly is it the seat of the nervous temperament. Therefore, the brain and facial outline, the neck outline, the middle piece outline, all of these are important as indications.

Points of the Dairy Cow—Muzzle.—The dairy cow should have a wide muzzle, because she is a large eater. She must have a wide nostril because she must be a large breather; the lungs have a great deal to do with the purification of the blood, the maintaining of the character of the blood, and milk is a product of blood.

It is claimed, that if you were blindfolded and given a drink of warm milk, and another of warm blood, you couldn't tell the difference, and whether that be true or not, milk is essentially a secretion from the blood, and the breathing power has a vast deal to do with the vital character of the blood.

The Nostrils—Should be wide, the

jowl strong and muscular, but lean and free from all indications of superfluous flesh.

The Eyes—Should be very full and intelligent and active, of a quick and lively expression. The eye is an unfailing indication of the temperamental character of the brain, and should be bright, indicative of quick comprehension, standing out very full so as to make a dishing expression to the face.

The Brain—Should indicate fullness. So you see that you have here a very delicate piece of work, and those of you who think that you can take this delicate machinery and saw off the horns and expose the inner chambers of the skull and not injure this nervous temperament, had better go slow. You may deal that way with your beef animal, but not with my dairy cattle.

The Neck—Should be thin, muscular. The spine is a continuation of the brain, and should rise full from the head. It is a good sign to see it extend above the shoulder blade.

The Back-Bone—Should continue strong, full and rugged, indicating unusual strength and size of process. The hips should be full and wide, long from the hip to the point of the rump. When we come to this point we commence the study of the maternal machinery, the office for which the cow was built. You must remember that you make merchandise of her maternity, of her motherhood. Treat her like a steer if you dare, and your pocket tells the story.

The Pelvic Arch.—Here we have the pelvic arch. This is a very excellent sign in a cow. It indicates strength of the pelvic organs, wherein lie the offices of maternity; it also indicates a very strong, full rise of the spine.

The middle piece should be very large and very full, indicating large power of digestion. The ribs of the dairy cow are wide, and the space between should be wide; the ribs of the beef cow are much closer set, and the rib springs out horizontally in order to form a place to lay a loin. The dairy cow should not be handicapped with extra weight, or superfluous flesh.

The Butter Gland.—Right here at the flank is a little combination of muscles, called by some the butter gland; it rolls under your finger like a lead pencil, and, as a rule, you will always find it in excellent dairy cows, and particularly in good butter cows.

The Flank and Tail.—In a good dairy cow, the flank should be thin. In a beef animal it should be thick and heavy. In the dairy cow, the tail should be long, indicating a full, strong, spinal construction clear through, and that indicates a powerful nervous organization.

The Udder.—The mamary gland, or the udder, should have good shape, high behind, reaching well forward upon the abdomen. The cow, Mary Anne of St. Lambert has the most marvellous udder I ever saw upon a cow. She is thirty-three inches in the medial line of the udder and twenty-four inches is a good long line in any cow. A good udder should be not meaty and thick, because then it is inclined to garget. The inner formation of the udder of a butter cow is very elaborate, and the more solids there are in the milk the more danger there is of garget, and the more wisdom and care you must exercise. That is the reason the Jersey is more liable to garget than other cows.

Constitution.—A cow must have constitution, but she should not be hardy, in the sense that I hear people talking about a hardy cow. I often think how little they understand the significance of the word.

A cow must not be hardy in the sense

men talk of it, but she must have constitution. The bookkeeper must have constitution to stand the confinement of his life, but he need not be hardy in the sense of bearing exposure. Constitution is endurance in a given line of action. I may not have half the endurance that John Sullivan has to stand up and be knocked down, and still I might excel John Sullivan twice over in sitting at the desk.

You must not call upon the dairy cow to be hardy in the sense of bearing your neglect. She is a mother, and as a mother you must treat her with motherly conditions. What are they? Warmth, the first thing. A dairy cow cannot secret milk if you force her to be chilled.

Formation of the Navel.—The best indication of constitution that I know of is the formation of the navel. I ask every farmer here to go home and look his herd over and find me a single cow of large performance that does not show a very strong full developement at the umbilical or navel point. A strong conformation here means constitution, vitality, power of endurance, within the line of heredity and her natural functions. Constitution cannot be trained into a man, neither can it be fed into him; it must be born into him. Therefore, it is that which you take from your mother.

My attention was first called to this by seeing a regular army surgeon reject men for the army. I saw him turn off men who were strong shouldered, heavy lunged, straight limbed, perfect looking men, and I was astonished and I said, "Doctor, what is your reasoning?" and he showed me the weakness of this man's construction at the abdomen and said: "That man has no endurance or vitality; the moment you put him into army service, he will go down." He told me also that he had carried this theory farther in a study of animals, horses particularly. I took it up in connection with a study of the cow, and for fifteen years, whenever I have seen a cow of large performance, I have looked to this point and I have failed to find a single instance in which a large performing cow did not show well at this point. This is the channel through which support comes to the offspring, and if the off spring is largely supported, they show a full conformation.

The Nervous Theory.—Now, gentlemen, I want to call your attention in confirmation of this nervous theory to the udder, and I am done. The mammary gland is a complete net-work of cells and nerves. A marvellous combination of nerves surround this whole udder as a net-work, which is called the sympathetic plexus. From that this nervous system proceeds directly to the uterus and from the uterus to the lumbar region of the spine, and from the spine to the brain, and here is the combination, a current that governs this milk function. Milk fever sets in, starting with a chill; it is a nervous disease. These nerves telegraph to this great secretory organ, "stop work," and the disease commences to spread, passes along the sympathetic plexus until it strikes the spinal marrow, and the cow drops, the spinal column being involved. Now, it begins to show its effect as it approaches the citadel of life, and by and by it strikes the brain; she swings her head from side to side and dies a victim to her own maternity, and thousands of times to men's ignorance and stupidity.

If you understand clearly this physiological action of the nerves in the production of milk, would you treat the cow as a mother, or would you treat her brutally? Would you give her cold ice-

water to drink when any intelligent understanding of the function of motherhood knows to the contrary? Would you give her cold barns to live in; would you give her food calculated to produce a flow of milk, or would you feed her like a bullock?

These are questions that come out of an intelligent understanding of the dairy cow, and the kind of a cow a dairyman should have.

MONEY RETURNS FOR FOOD CONSUMED.

By CHAS. R. BEACH, Whitewater Wis.

Second Paper.

The Subject Important.—I am expected to confine myself exclusively to the feeding of dairy cows, and to tell how to feed a cow so as to get the most money, not out of the cow but out of the food.

This distinction is a very important one, and one that is often overlooked, especially by those who are ambitious to report large yields per cow. Many of our largest reported yields of butter show an increased cost per pound out of all proportion to the extra amount produced.

Its Difficulties.—Were the cow an inanimate machine, constructed upon known and well understood scientific principles, in no way effected by external surroundings, whose capabilities of working up raw materials was always and invariably in the exact proportion to the force applied—and that force something distinct, and outside of what was to be produced—it would be comparatively an easy matter to tell with aproximate certainty how much milk, or butter, or cheese, or money, you could get by feeding a ton of hay, or corn, or oats, or bran when alone, and also how to combine them for the best results; for knowing the chemical ingredients in the article we wished to produce—and also of the materials from which we were to obtain them—we could determine the exact combinations of the different materials that would give the largest per cent. of production.

But when we find this machine that we are compelled to use, is a piece of living mechanism, more complicated than any steam engine—self acting—with inherited powers and tendencies, which can only be aproximately estimated after a full knowledge of its ancestrial antecedants, and individual peculiarities, subject to a hundred external as well as internal influences, many of them entirely beyond our control, we realize the hopelessness of attempting to predict beforehand the amount of production from a given amount of material.

But farther, when we come to know that the force by which this living machine acts must be supplied out of the materials from which we expect our products, the problem becomes still more intricate.

Cows as Conservers of Force.—Yet with all these apparent disadvantages, we may congratulate ourselves upon the fact that the cow, as a conserver of force, is vastly superior to any mere mechanical contrivance yet invented. In the most perfectly constructed steam engine now in use, not more than ten per cent. of the energy of the heat in the coal is utilized in making steam. And further it is claimed that less than four per cent. of the heat imparted to the steam in an ordinary locomotive boiler is utilized in the performance of labor on the engine, 96 per cent. being thrown away and lost in the exhaust steam.

Returns.—The cow, on the other hand, even with our imperfect knowledge of how to feed her, gives us back in products something like ⅓ of the materials furnished in the food; and the remaining ⅔ which she uses to supply the wastes of her own system, she returns, all that is of value, in manure, by which the fertility of our lands is maintained

If in the economy of nature, our live stock were able to give back all the materials in the food, in the form of pro ducts, the earth in time would become an unproductive waste, incapable of maintaining animal life or vegetable growth.

But if to the part she returns to us, she has given an additional value, making it worth more than the whole raw material, the more she returns to the soil the better.

How to Feed.—But what have we learned, and what do we know about how to feed cows so as to make money above the cost of the food we give them? That there is difference in cows, and the kind we must have from which to make the most money, must be one with both those inherited and acquired tendencies that best qualify her to convert her food into milk of the required standard.

Requisites.—She must be in good health, a good eater, and have good digestion; must be not less than four years old, nor more than nine; easy milker, and of a kind and gentle disposition; not above the medium size, and thoroughly feminine in her organization. She must be surrounded with those conditions that most conduce to her comfort. The more comfortable or perhaps I had better say the less uncomfortable she is, the greater probability of her making paying returns for food consumed (we all know how a cold rain in spring or fall will shrink the yield of milk). She should have an abundant supply of hard water, and should be salted every day or every other day.

Milking.—She should be milked by the same person at regular hours that should divide the day into two equal parts, as near as convenient, and when one person milks several cows they should be milked in regular order.

It should be so arranged that the largest flow of milk should be during that part of the year when dairy products are highest, which will be in the fall and winter. Not only will the money returns be larger, but, with good care, the amount of milk will be also larger.

Value of Food Consumed.—We will now consider the question, "What and how the cow should be fed so that we shall get full value in money returns for food consumed." The scientific plan would be to first determine the amount of food of support, so computed as to make up for the waste of proteine caused by the action of the muscles—the loss of fat, sugar and starch burned in supplying the heat of the body, and in addition to that the amount necessary to supply the caseine, the fat, the sugar and the phosphates in the amount of

milk we expected to produce. But as my manner of life has been more in the manner of doing than of study, I shall pursue a somewhat different course.

Land to the Cow.—I will set apart to grow feed for this cow, two acres of land, worth for farming $70 per acre. One acre I will devote to pasture, one-half acre to hay (which should yield one ton of early cut hay), and one-half acre to the growth of yellow flint corn, planted in rows four feet apart, with hills one and a half to two feet in the row, with from four to six stalks in a hill, which half acre will yield not less than seven tons of sweet ensilage. Larger yields can be obtained, but I think it desirable to supply corn rations in the ensilage ration than feed corn meal separate. We will leave enough of this corn in the shock to make one-half ton of ensilage.

System of Feeding.—As we propose to make the most of our milk in the fall and winter, we will commence our year on the first day of October, with our cow fresh in milk, and will feed her this month pasture grass, the shocked corn we have saved, and ten pounds of wheat bran daily. On the first of November we will go into winter quarters and feed up to the 15th of May (195 days) a daily ration of 45 pounds of ensilage, 10 pounds of hay and 10 pounds of wheat bran, fed in two feeds, making, with the corn fed in the shock, five tons of ensilage, one ton of hay, and 2,250 pounds of bran. On the 15th of May we will turn her on this acre of pasture and for the next 100 days we will feed her daily four pounds of bran, and (if she will eat it) 10 pounds of ensilage, as we have two tons left from the winter feeding. Forty days she may go dry and live on pasture grass alone, with this additional feed of 2,650 pounds of bran, which at $12 per ton, will have cost $15.90. Two acres of land has more than furnished feed for the cow a year, as we have ensilage left.

Yield.—This cow need not be a very uncommon one to make from the first of October up to the time we turn her to grass—225 days— from the feed we give her, 225 pounds of "butter, or one pound per day," which if good would sell this year, and almost any year for the last ten years, on the open market of Chicago, for 27c. per pound net, or $60.75. For the next hundred days she will make 60 pounds, worth 20c., or $12.00, 285 pounds in all. In making this amount of butter she will have given 5,600 pounds of milk, worth for feeding 20c. per hundred, or $11.20; calf $1.00, making the gross income $84.95, from which deduct the price of bran fed, $15.90, and you have $69.00 as the result of feeding the product of two acres of land to a cow—$14.00 for the pasture and $55.00 for the acre of corn and grass, and after paying the interest on $70 at 7 per cent. we have $9.00 for the pasture and $50.00 for the corn and hay. Had the cow come in in the spring, the product from the pasture would have been greater, but the net income smaller.

Profit.—The cow in pasture has cost no labor, and of the acre in corn and meadow, only one half has cost anything for cultivation.

The amount of net profit will depend upon the price charged for the work performed, which each one must fix for himself.

But unless he estimates it higher than we generally receive for what we do, the margin will be a handsome one—$59.00 ought to pay well for the work and the use of the cow, and farther this extra feed given to the cow when on pasture, will have increased its productiveness, and the manure made from feeding the hay and the ensilage corn, with that from the ton of bran purchased, if pro-

perly applied, will have maintained the fertility of the acre used to grow the winter food, and so the farm is richer rather than poorer.

Estimates Not too High.—But you say that these figures have no practical value, for they are merely imaginary, and that they are never realized in practice. True, in one sense they are imaginary, for they do not give the exact rations or the exact production of any particular cow. But the amount of production named for this single cow, and the amount of many estimates is exceeded by quite a number of whole dairies, within my acquaintance, numbering from fifteen to thirty cows each, and the ration named is one fed this winter in my own dairy of over twenty cows, and they have thus far averaged since the middle of November for each and every cow over a pound a day, the amount named in my estimates.

It is true that among our best dairymen more land is allotted to the support of a cow than I have named, partly for the reason that very little of our lands are worth $70 per acre for farming purposes, and partly for the reason that we have not yet learned how to grow and preserve our feeding crops, and how to feed them so as to get all we ought out of them. When we have learned this part of our business, we need not own all creation, or work sixteen hours a day, to make ends meet, or to provide a reasonable income for ourselves and families. We shall yet learn that a cow can be well kept and full fed upon the product of an acre of land.

Unproductive Capital.—One of the greatest hinderances to a better system of farming, and one of the heaviest of dead weights that the majority of Wisconsin farmers are carrying, keeping them comparatively poor, so far as having the available means of supplying their own wants and the wants of their families, is the large amount of unproductive capital tied up in land, and the small amount of working capital available to use in making those lands more productive. Let us now, for a few moments, consider whether this winter ration that I propose to give and am feeding my cows—45 pounds of ensilage, 10 pounds of wheat bran and 10 pounds of early cut hay—bears any analogy to that laid down by the scientist.

The German Formula—For a cow giving milk is 24 pounds of dry organic food, of which 15 pounds should be digestible, composed of 2½ pounds of proteine to 12½ pounds of carbo-hydrates.

Experiment Station Standard.—At the experiment farm, in 1884, 3.27 acres of corn averaged 4,490 pounds of dried stalks and 4,941 pounds of corn, or a gross weight of cured products of 9,431 pounds. Allowing this to be one-third of what this corn would have weighed had it been cut and put in the silo when fit for ensilage, one acre would have weighed 28,243 pounds, or 14 tons or the exact weight that I had claimed for my ensilage. I shall presume, therefore, that 45 pounds of ensilage will be equaled by 15 pounds of the same corn when thoroughly dry. We then have:

	Proteine.	Fat.	Carbo-Hydrates.
10 pounds of hay Containing.....	0.48	0.11	5.00
10 pounds of wheat bran containing.	1.30	0.30	4.57
45 pounds of sweet ensilage*.....	1.30	0.19	6.86
	3 08	0 60	16.42

Or ½ pound more proteine and 4 pounds more carbo-hydrates than the German standard, but the proportions are very nearly identical.

Summary.—So that we may be reasonably certain that two acres of good land,

*Equal to 15 pounds of dry fodder corn with ears, if my figures are correct.

handled as I have outlined, with a ton and one-quarter of wheat bran purchased, will furnish ample food a year for a cow that will make 300 pounds of butter, and that the hay, the bran and the ensilage fed as I have suggested will furnish rations nearly identical to those that science has indicated as being most economical in production and also giving the largest amount in returns, and I can not help but believe that the succulence of the ensilage will contribute largely in making all the food more digestable, and so of increased value. There may be better ways than I have outlined, but when the dairymen of Wisconsin have learned how to keep a 300 pound butter cow for every two acres of land devoted to dairy purposes, by purchasing a ton and a fourth of bran per cow they will have taken a long step toward cheapening production, and will receive full value in money returns for food consumed.

DAIRYING FOR PROFIT.

By E. G. FULLER, Calumet County, Wis.

Third Paper.

Elements of Success.—The subject assigned me is a large one—so large in fact, that in the time allotted me, I can only give a glance at some of the elements which contribute to success, and hence to profit in this branch of agriculture.

The first thing to be considered in this connection is the man. It is a broad truth that no man can attain the highest success in any calling unless he has a natural love for the business or profession in which he may engage. Having this, he will naturally strive to gain all the knowledge possible in regard to his profession; not simply for the purpose of making his business more profitable, but because it is a pleasure to acquire this knowledge. When our labor gives us pleasure, half of its wearying effects are taken away.

Love for the Calling.—The man who would attain the highest success in dairying, must have a natural love for the calling. He should be fond of animals; because if he is not, he will not be likely to give them the kind and considerate treatment which is an important element in the care of the dairy herd. Some one of the institute workers has said, that the whole story of the care of the dairy cow was summed up in one word, "comfort." That about tells the story; and it takes a man who naturally loves his animals to look carefully to their comfort.

Who of us does not know so-called dairymen who approach their resting animals with a kick and an oath, when about to milk them? Who has not seen some fool of a man tie up a nervous cow and pound her, in order to break her of kicking or running away, when careful and judicious treatment was required? Such a man has no place in the dairy.

Requisites of Success.—The dairyman should be a man of intelligence, of education, and of business ability.

Only a few days ago, in an institute, the writer heard a paper read by an ex county superintendent of schools, in which he almost ridiculed the idea of education for a farmer. Agricultural colleges were denounced as a humbug, and the statement made that as soon as the farmer's boy got a bit of education he left the farm, and if he did not he was a fool for not going where he would have an opportunity to use his education to better advantage than he could on the farm. The writer of that article was certainly wise in leaving the farm, if he could find no room thereon for the expansion of his mighty brains.

Knowledge on the Farm.—There seems to me no calling or profession wherein a more varied knowledge can be used to advantage than on the farm. There is none which pays a larger percentage on intelligence, education, and business ability. Nature, mother Earth, responds bountifully to the man who seeks intelligently for her treasures, and it is just in proportion to the intelligence displayed in our calling that our profits are.

The Dairyman's Education.—Think of the diversified knowledge that must be possessed by the dairyman! He must understand the nature of soils, and their adaptation to different crops. He must know how to feed them, that they may not deteriorate in value; in fact he should increase the fertility.

He should know something of that most mysterious of nature's laws, the law of heredity, in order that he may breed intelligently, and thus produce animals that will contribute generously to his profits.

Care — Food — Marketing. — He should understand the anatomy of the animal body, and know the symptoms and remedies for at least the mere common diseases among his stock, that he may treat them in case of sickness. He should understand the comparative value ofdifferent foods, that he may be able to feed his stock economically.

He should be a business man, and study the markets, so he may purchase what he needs to the best advantage; study the demands of the market, and seek to supply those demands at the time they are most wanted.

Keep Posted.—He should keep posted upon the advances being made in his business. The many agricultural papers, and bulletins of the Experiment Stations, should find their way to his home, and be carefully studied. But not all we read is gospel truth; hence the dairyman should be an experimenter to a certain extent, that he may satisfy himself of the true value of newer methods.

Get Near the Ideal. — No doubt many are saying that I am placing my ideal dairyman very high. Perhaps so; but ideals are always above the real, and it is only by placing ideals high that a high degree of excellence in any profession may be attained. Of course many are pursuing the business of dairying profitably who come far short of the ideal I have sketched, but I believe the nearer the ideal is approached, the more profitable will be the business.

Book Lore on the Farm.—While I believe that a great deal of book lore will always be found profitable on the farm, I would never consider it superior to good common sense, but if I can find a happy combination of the two, I think the union a good one.

Points for Consideration.—Now, I will try to notice a few of the points to be taken into consideration by the man who would pursue the business to the best advantage.

First, he should consider the branch of the business to which he would de-

vote his energies—whether to the production of milk, cream, cheese or butter. Of course his location must do much toward shaping his decision in the matter.

The Sale of Cream—For city use is undoubtedly the most profitable way of disposing of dairy products, but comparatively few can secure this method.

Butter Making.—If butter is to be his specialty, he should decide how the product is to be manufactured, whether at home, or at the factory. While the latter system will prove a great labor saver, and in nineteen cases out of twenty the more profitable, the private dairyman who will throw himself energetically into his business, make a first class product, and market it in a business-like manner, will undoubtedly make the greater success. Of course no one thinks of producing cheese except upon the factory system.

Selecting the Cow.—Having decided upon the branch of dairying he is to pursue, he should select a cow adapted to the business, and breed her in a manner not only calculated to reproduce her kind, but to improve upon her. It may be urged that the average farmer about to engage in the dairy business, cannot afford to purchase thoroughbreds of any breed, nor is this necessary. Secure good native or grade cows, test them that you may be sure of their capacity, keep none but good ones; aim to secure a herd that will produce an average of not less than 300 pounds of butter per annum (the more the better), but the cost of production must not be overlooked. The profitable animal is the one that produces the most at the cheapest prices. Such a herd can not be picked up in a day. It must come as the result of careful breeding and selection. The herd should be headed by a thoroughbred sire carefully selected from the breed decided upon. He may be used five or six years, then another from the same breed and same general family should be selected. By careful and judicious selection, in a few years an excellent herd may be built up. As well expect to win the Derby with a Percheron as to expect to attain the *highest* success in dairying with a general-purpose cow.

In the East many dairymen do not try to breed their own animals, but depend entirely upon purchases to keep up the herd. Some make money by purchasing fresh cows, feeding them heavily for a single year, and at the end of their milking season turning them off for beef.

This is not what would be termed high class dairying, nor do I think it as profitable as where a man breeds his own animals judiciously.

Defective Stables.—Next we will consider something of the care to be given the herd.

Comparatively few of our stables are warm enough to keep milch cows to the best advantage. Warmth not only conduces to a more liberal flow of milk, but it also decreases the food consumption. The same food required to support two animals who have only the shelter afforded by a shed or the warm side of a straw stack, will support three warmly stabled.

Many of our stables are ventilated by a half inch crack every 12 inches, but when stables are of proper warmth, there is often a ventilation so that upon entering the stable, the smell that greets one is anything but pleasant. This is a matter that needs attention, as the health of the animal and the purety of the product depends largely upon the neatness of their quarters.

Warm Water—In winter for milch cows is another innovation, looked upon by many as a sort of hot-house method of heating cows. But the experience of the hundreds of dairymen who have

tried it is so strongly in its favor that it can no longer be considered an experiment, but a steamer or tank heater will be considered a part of every well regulated dairyman's outfit.

Economical Feeding — Is another and very important point to be considered in the matter of profit in dairying; and it opens up a big field for study and investigation.

Judging from what I can learn through the mediumship of books, more progress has been made in the science and art of feeding during the past decade, than had been made in a century previous. Farmers are waking up to the fact that there is a science as well as an art in their vocation,

The educated minds of the nineteenth century are turning their investigations to the benefit of the farmer; and no matter how much the masses may scoff at those "scientific fellers" and book farmers, there are but few of us who are not, to a greater or less extent, reaping the benefits of their investigations.

Summering and Wintering.—Many farmers (but few if any of that kind are before me to-day) still pursue the old expensive way of keeping their stock through summer on pasture, and winter on hay and straw.

Their cows give milk through six or seven months of the year, and are kept through the winter at a positive loss.

The class that a few years ago recognized the need of succulent food to maintain their animals in thrifty condition, and supply this by means of growing root crops, has now found that the silo supplies the needed element at a far less cost.

A careful study of the wants of the cow, and the composition of feed stuffs have given us a clearer idea of what to feed and how to feed it in order to produce the best results.

Corn Fodder—Has formed no inconsiderable portion of dairy rations in the East for some years; yet we are just beginning to understand its value. When planted as it has been, sown broadcast at the rate of two or three bushels per acre, or planted in drills so thickly that no attempt was ever made to form an ear, no remarkable results were obtained; but to-day, with the methods of planting now in vogue, when eight quarts of seed will suffice for an acre, and eight to fifteen tons can easily be grown to the acre, each ton worth as much, pound for pound, as good timothy hay, we cannot shut our eyes to the fact that an important element has been introduced into our dairy husbandry.

The Silo.— But our corn fodder is difficult to cure and handle to the best advantage. The silo here steps in and offers an opportunity to store our fodder in the best possible space, and to preserve it in the best condition for feeding. It gives us a green, succulent food, upon which cows thrive well, and give as full a flow of milk as upon summer pasture. But in feeding ensilage it should be remembered that we are feeding a summer food, and must approach as near as possible to summer conditions in the care of the animals. A warm stable is a necessity in feeding this kind of food.

Improved Methods.— Not only has modern investigations improved our methods of manufacturing dairy products, raised the standard of quality, decreased the cost of production by means of cheaper food, and more intelligent use of food; but careful breeding and scientific feeding has largely increased the capacity of our cows, just as breeding and training has developed the modern trotting horse.

A Well-Balanced Ration. — Care and intelligence are needed in forming a

proper ration for an animal. The two most important points to be considered are how to secure a well-balanced ration, *i. e.*, one which shall furnish to the animal the proper proportion of carbohydrates and albuminoids. The one to keep up the animal heat and supply the bodily waste; the other to be turned into fats and returned to us in the form of flesh or milk. But many combinations can be made which will supply these elements in the proper proportion and the point dairymen must study is how to make up such a ration at the minimum cost.

Of course those of us who have been brought up on a farm, and have had the advantage of years of observation and experience, have learned by actual trial what combinations give good results, and we would not be found giving a milch cow a heavy feed of corn meal when the forage being fed was rich corn fodder or ensilage, nor trying to balance a forage feed of straw or timothy with bran alone.

Rations Must Be Tested.—A German chemist named Wolff, has given us a table of feeding standards, based upon the composition of animal bodies, and their products. But while this may serve us as a partial guide, combined with the analyses of feed stuffs, all the deductions can not be accepted as absolute. In fact, there is a chemistry of nature which none of us can understand, and the rations given us must be subjected to actual trial and comparison, before we can reach a final conclusion as to their utility.

Chemical Analysis.—A striking example of the lack of chemical analysis to do justice to the merits of a forage ration is found in the feeding results experienced with ensilage. In nearly every case actual trial has shown it to be superior to what chemical analysis had claimed for it.

Now chemists tell us, that if properly handled, ensilage develops lactic acid while in the silo; that this in itself is a stage of digestion, hence requires a less expenditure of energy to digest, *ergo*, we get better results from a stabled quantity of green forage ensiloed, than from the same quantity fed in a green state. Is this true? Some first class practical men claim it for a fact, but it will still bear investigation.

Ensilage as a Ration.—Be that as it may, ensilage certainly forms the basis for the cheapest ration that can be fed our dairy stock. Contrast the cost of a ration with ensilage as a basis, with any other food that we can feed a cow, and note the great balance in favor of the ensilage ration; and when we remember that the practical results are in favor of the cheap food, I cannot see how our dairymen can hesitate to adopt this method of supplying their cows with forage.

Model Rations.—Here is a model ration given by Wolff, for milch cows:

	Lbs.
Meadow hay	12
Oat straw	6
Mangolds	20
Brewers' grains	25
Cotton seed cake	2

At a moderate estimate this ration will cost 25c. per day.

Here is another compiled from his tables:

	Lbs.
Cured corn fodder	20
Rye straw	5
Malt sprouts	6
Cotton seed cake	2

This is a much cheaper ration, costing 14c. per day, and in my opinion would not prove a good practical ration for a cow.

Another ration compiled from Wolff's tables:

	Lbs.
Corn fodder	15
Bran	5
Malt sprouts	5
Corn meal	3
Cotton seed meal	2

This will cost about 16c. per day, and make a good practical ration, but too expensive.

It is useless to extend this list. Any leading agricultural paper contains plenty of these rations based on the German tables, Prof. E. W. Stewart supplying several papers with combinations, which will contain in a given quantity the proper quantity of the three elements—carbohydrates, albuminoids and fat. But while these rations may be very well to theorize upon, as a rule they are too expensive to be practical.

The Nutritive Ratio.—These standards call for a nutritive ratio of one to five for a milch cow. That is one part of protein to 5 of carbohydrates and fat.

The protein is the most expensive element to purchase in foods and some of our best dairymen get excellent results, by feeding a ration in which the nutritive rato is only about 1 to 4. The cost is much lessened and it is a question if the results are as good.

The Tables Theoretical. — These tables are theoretical. Prof. Stewart's rations are theoretical, based on these tables. Now comes in the dairyman's part. He can well afford to be an experimenter to a certain extent, in order to satisfy himself of the practical utility of these standards.

Prof. Armsby's Ration.—Here is a ration compiled by Prof. Armsby from the tables:

Corn ensilage	20
Clover	10
Corn meal	5
Bran	5
Oil meal	2

At present prices this ration will cost 19c. per day—too much for the practical dairyman.

Cost of Feeding.—Several of our Wisconsin dairymen manage to feed cows at a cost of from 7 to 10 cts. per day by making ensilage the basis of their ration, which, with the addition of a few pounds of bran, shorts or pea meal, will give excellent results. The last mentioned food is one that is deserving of more attention.

Pea Meal and Bran.—A year ago, upon my father's farm, we had to depend principally upon marsh hay as a forage ration. We had quite a large quantity of peas, and instead of selling our peas, originally intended, we ground several tons—mixed equal quantities by weight, of pea meal and bran, and secured the best results of any grain combination we could make.

Summer Feeding—Is also a place where we can make decided improvements. At the price of our Wisconsin farm lands, we can scarcely afford to depend upon pasture as our only summer food. A light grain ration and a practical feed of soiling crops and perhaps of ensilage will be found a measure of economy. Rye, corn, peas and oats, clover, millet or Hungarian grass can be used to advantage for this purpose.

Economy of Labor.—Another thing we should do is to study economy of labor in the arrangement of our buildings. This is too often neglected, and the labor of caring for our stock made double what it ought to be.

If the farmer is to make butter, he should have a neat and convenient dairy-house, well supplied with all the modern conveniences in butter making, and put upon the market nothing but a first class product. Let every package go into the market with his own name upon it, and let that name stand for a synonym of the purity and fine quality of the contents of the package. In time he will find that it will give an added value to every package.

Object of Paper.—The object of this paper has not been so much to give specific directions or instruction upon any particular point in dairying, as to

awaken thought all along the line. And when a man gets to thinking seriously and earnestly upon any topic, he is on the right road to success.

EQUALIZING DAIRY PRODUCTION.

By Hon. HIRAM SMITH, Sheboygan County, Wis.

Fourth Paper.

Expensive Methods.—The underlying principle of all farmers' institutes, dairymens' conventions and agricultural conventions, is the supposition or knowledge of the fact that many of the methods and processes pursued by the farmers of this State, and all other States, are expensive, which are pursued continually at immense loss. If all the farmers of this State had been practicing upon sound scientific principles, their labor all well paid, their methods of feeding such that nothing should be wasted, and no losses sustained, selling their products at proper times so that no waste is realized in that direction, we would have no necessity for farmers' institutes. But because that is not true, is the reason of the farmers' institutes, that in this way we may study facts by which we can correct our errors, and, therefore, I wish to point out, on this occasion, a few of the errors that a great mass of the dairymen in this State are guilty of without any profit to themselves, without saving in labor, without doing anybody any good whatever. They are constantly wasting a very large percentage of the products they get out of the soil and out of their cattle.

Summer Dairying.—First, the great mass of dairymen in this State are engaged in summer dairying. Their cows commence to give milk about the last of April, or the first of May, running until cold weather; then they dry off, and the winter product amounts to but very little.

There are a few exceptional localities that have learned better in that respect. Now, I know something about this, for I have paid a heavy tax of waste in pursuing this same course. You all know the difficulty of marketing butter in the summer is very great. You read the market reports, and you see that nearly all winter butter has sold for thirty and thirty-five cents, while nearly all last summer it was fifteen and sixteen cents.

Now, you know without my telling you, that the great body of the milk is gathered in May, June and July. Cows will give a big flow of milk then; they are having the best feed of the year, the best you have got. You can hardly find a poor cow at that time of year. Your cow is giving a large flow of milk, you are taking the milk to the factory, it is being manufactured into butter and cheese, and when the sales are made, they are the lowest of the entire season.

We were brought up to do business in this way; we knew of no other way, and a good many of us can scarcely see how we can avoid it; but is there any motive to avoid it? Most certainly. There is

at least thirty-three per cent. motive to change the whole business, and a very large portion of the farmers of this State are adding thirty-three per cent. without adding an *iota* to their investment and without giving one day's extra work to the profit on the cows.

Winter Dairying.—How will you do it? Have your cows come in when dairy products begin to go up in price, when they are scarce in the market, from October up to about this time of year, and dealers are handling it with a great deal of confidence. They can send it all over the South, in safety, and there is a good paying price offered for it. Now, why cannot the change be made? The objection is often urged that if I have a winter dairy I must have a warm stable. Of course, but you want a warm stable anyway if you are going to keep cows. You are suffering a great loss if you are feeding in a cold stable. You can't afford the expense of warming your cows with expensive food.

Make the Change.—After you have got your stable warm, then the change in very simple indeed. You have more time to attend to the manufacturing of butter if it is done on the farm than you have in the summer. In the summer you want to be engaged in cultivating your crops. In the winter there is but little to do. Therefore, you have more time to attend to your butter, and if your cows are giving the most milk and you are getting thirty-three or four or five, frequently up to forty cents, for the butter, it makes you feel pretty well, and a man who feels well, happy and bragging to his wife at the end of every sale, begins to think it is a pretty good business; but when a man has an immense amount of milk in June and his butter is selling for fourteen or fifteen cents, he goes home and says to his wife: "Well, this is poor business, I have got to get out of the dairy business."

But you can't get out of the dairy business in Wisconsin. Where will you go to, what will you do? We are here. we can't get away and we don't want to get away. Some men talk about raising big horses. It don't pay like a dairy.

Reform Methods.— We can't better our condition very much by going out of the business. There is a good opportunity to do better right where we are. Our investments need not be enlarged; but let us merely reform our methods, and make our labor count, and when we work hard let us work for thirty cent butter instead of fifteen cent butter. We can make just as many pounds; we can make more pounds. Cows will milk more months in the year coming in in November and December, when they would naturally begin to fail in their milk, and then when they do begin to fail in their milk they have succulent fresh feed, and it keeps them along and they seem to forget to dry up. It is an uncommon thing for my cows to go dry more than four weeks, and if one does, I say: "That is the one to weed out."; We can accustom our cows to milk eleven months, and they will give the largest flow when we can get more money, and the least when the products are worth less. If our cows dry up in August, and butter runs down to fifteen cents, it doesn't bother me. I don't care much where butter goes.

Results.— It makes one more watchful, it makes us happier, it makes a man more liberal to his wife, and she will treat him better, and she ought not to unless he treats her well. You can clothe your children better and spend a little more money every year giving your son and your daughter an education, so that they can be somebody in the world. It don't pay for them to

grow up and get sick of the farm and go to Colorado, and come back and be without any interest in the farm, without any fixed principles. We have ample room right here to make all the needed improvements, which we can easily and cheaply do.

SHALL FARMERS' WIVES MAKE BUTTER?

By JOHN GOULD, Western Reserve, Ohio.

Fifth Paper.

They Should Not be Asked.—Shall the farmer's wife make butter, and if so, how? In the first place she shouldn't be asked to make butter any more than she should be asked to spin the wool and knit stockings. That is my position on the question. The co-operative factory should take charge of the butter making. But we are not all ready for it; there must be preliminary steps taken before we get to that.

Good Machinery Required.—Then, how shall the farmer's wife make butter? If the farmer has good machinery on the farm, he should furnish his wife with good machinery with which to work, to make the butter, and any man who doesn't provide his wife with good machinery with which to make butter, should leave his own machines in the barns and cultivate his fields as he has for years past, for his wife is just as good as he is.

Good Milk.—Another thing; if the farmer's wife makes the butter, he should do the milking. A farmer's wife in the year of grace, 1888 is not built for milking. But to come down to sober realities. If she has to make the butter, she must be provided with good milk out of which to make it, because the milk determines the quality of the butter when made. No one can make good butter out of poor milk. If it has become loaded with stable odors, it will have a stable odor when made.

Good Feed.—Now, how shall we get good milk? You have all heard about the good cow and her good food. We must have first a good cow; she must have all the comforts that a cow is entitled to; she must have good feed and good care, and then we may reasonably expect to get good milk. But remember this—if we are after good butter, then we need to feed a food to our cows which is in the line of keeping with butter, so we should feed blood-producing food. You have been told here this afternoon that milk is an elaboration direct from blood, so if we don't have good, abundant blood, out of which to elaborate this milk, then we fail in getting the highest type of milk out of which to make the butter. Now, our cows should be kept in a cleanly stable, and all the sanitary conditions observed which go to make a good production of butter.

Perfect Cream Raising.—The milk having been brought into the house as quickly as possible after the milking, should be set out as quickly as possible,

so as to get a perfect cream raising by the falling temperature of the milk. If our cream stands around until it gets practically cold and we set it out then, we don't get good results in our cream raising. Milk is made up of several elements, one of which is sugar, another is caseine. When our milk gets down to a certain temperature, there is a change of those elements that appear in the milk and prevent the cream coming to the top; so we will set the milk as rapidly as possible, and at as warm a temperature as we can.

How Shall We Set the Milk.—Just how we shall set it, I don't know. If you can get some good creamer, that is the better way; if you can't, set it in the good old way, in a room free from contaminating influences. Let us skim this cream before the milk gets thickened under it. The market is paying a high price for butter flavor and not for buttermilk and salt flavor. A lot of thickened sour milk may get into the churn and is so much influence against getting a high quality of butter; therefore let us skim the cream before the milk thickens.

Ripening of the Cream.—Let us hasten the ripening of this cream in the winter in some way. Cream usually stands too long before we churn it, so that acids attack some of the fine flavoring oils that give the butter its distinguishing characteristics, and we lose that fine flavor; so we will hurry the ripening of the cream by keeping it warm. I wouldn't care if it were warmed to seventy degrees, and then brought back to the churning point.

Churning.—Let us churn our cream with some of the later ideas of churning. We do not churn the cream to tear off any imaginary envelope that was once supposed to exist upon the globules. We simply churn it to get the buttermilk; the butter gathers afterwards, so any revolving churn is better than a churn that beats and mashes the globules of the butter. We want a thermometer so as to keep accurately the temperature of the cream. If we use our fingers for a thermometer, we have every time to go and wash our fingers, or do the other thing. Stop churning when the butter globules appear about the size of small shot. There is a little difference of opinion about this, but that is a good point at which to stop.

Washing.—Having churned, don't fill the churn over half full. I want some space when I wash out the buttermilk. Why shall we wash out the buttermilk? There are sugar and cheesy elements in it that we can wash out much better than we can work out, so that to our four or five gallons of cream we put in a couple of handfuls of salt. If I put in a little salt and churn a little bit, the butter rises right through the buttermilk and comes to the surface. Let it stand a moment and then we can draw the plug from the bottom of the churn and draw the fluid out. Put back the plug; there has been no loss of butter at all. Add a little more water and salt, and the next time it will come to the surface a great deal quicker and if it doesn't the second time, try it the third.

Salting.—Now, let this drain a few moments and get the great bulk of the water out of it. I want to try and salt this butter and pack it at the same time. After it has drained so the water only occasionally drips, turn the churn down and you have your butter in the bottom of the churn in a granulated condition like sand. Sprinkle in the salt. Put on ten ounces, or a little more, and if it is too much it will not do any harm as it goes out with the water. There are two ways of salting. One is a brine process. You put in brine as salt as you can get it, draw out this brine and rein

force it with some more and turn it right back on the butter. Use this brine a little warmer the next time, probably about sixty-eight. Then, your brine is fully strong. It gives you a full half ounce to the pound, which is all you can do with the salt. In this way we get our butter at full strength, and we can gather it simply into a big ball in the churn with this brine and bring up our package alongside. The great trouble in trying to pack our butter in the churn was, that we attempted to do it with the butter too cold. It was mealy and we did not get it into the box; but if we bring it up to sixty, we can put it into our package and press it down into it, and we get all our butter and it is solid enough for the market requirements. If that is not quite salt enough for the market taste, then turn more salt into the churn and churn it into a big lump and pack it practically the same as with brine salting.

Granulated Butter.—We want to save another little bit of work here. The market is asking us for granulated butter, and if we will fill the boxes with the best granulated butter and then take a butter ladle and smooth it all slick, we have lost that granulated surface and lost a point with the buyer. So instead of that, let us take a stout string and draw it across, taking off a flake and leaving that granulated surface without any further working. Use new muslin to put over it. The market don't pay us any more for old muslin with button holes worked in it. Then cover it, put it away from the light and air as quickly as possible, and keep it in the best condition for the market.

Discussion.

MR. WHEELOCK.—Mr. Gould says, take the milk into the house as soon as it is milked. My system would be to have a creamery nearer the stable, and not take it into the house at all.

MR. GOULD.—That is right, but I said if you had not a creamery.

MR. WHEELOCK.—Five dollars will fix a creamery close to the barn where you won't have to carry it over twelve feet.

My plan is this: I am milking twelve cows; I use the shotgun cans; I have a tank which will hold eleven of these cans; it is set near the barn and there is a sort of open shed built over the top of it, so that when I want to skim in stormy weather, I can stand there out of the way. In cutting my corn for the silo I saved all the refuse, which was about three baskets a day, and that I packed in around my tank, and it is practically frost proof. The water is never frozen around the milk.

MR. CAMPBELL.—You say stop churning when the butter is the size of shot? Now, shot varies like the old lady's piece of chalk.

MR. GOULD.—Well, No. 6, bird shot.

MR. HIRAM SMITH.—There is some question about the amount of salt that can be retained in the butter. Dr. Babcock has had considerable experience in these matters, and I would like to hear what he has to say on that point.

PROF. BABCOCK.—At the New York Dairy Show, I took fourteen samples from the butters which obtained premiums at the show, and all of these being analyzed, the highest per cent. of salt which was found in any of these samples was four per cent. Four per cent. is just about two thirds of an ounce to the pound. The average per cent. of salt in those butters was less than two per cent., which is considerably less than half an ounce to the pound of butter. The fact is that in salting butter, if more than half an ounce of salt is added, the water retains a large portion of this, and it is worked out. The water which is re-

moved in working butter is very strong brine in every case, and the water which should be retained in the butter can not hold more than half an ounce to the pound under any condition. If more salt is added than will dissolve, it remains as crystals in the butter, and is a very serious objection which should always be avoided.

MR. GOULD.— May I ask you what the variation was in the water contents of these samples of butter?

PROF. BABCOCK.— As I remember, the highest was a trifle over fourteen per cent.; the average was about nine per cent. in the butter. They were nearly all butters packed in large packages.

MR. GOULD.— Then the report in the American Dairyman that one of those samples of butter had twenty-one per cent. of water was a misprint.

PROF. BABCOCK.— Mr. Gould has confounded the two tests. The butter which contained twenty-one per cent. of water was butter in the sweepstakes class, which was taken immediately upon working, and had not been packed at all.

MR. BENDER.— Can you pack butter and salt it in the churn, as you have just stated, with your ladle, and get out the water so that the package won't drip, and there will be enough salt in it?

MR. GOULD.— Yes. By gathering it and putting it in in small amounts, we get just the right condition we want. The trouble is, we try to put in five or six pounds at a time instead of a small amount. We take out the moisture with a damp cloth, or by just tipping it one way. Between each layer you have to take up the surplus moisture.

BUTTER-MAKING ON THE FARM.

By F. C. CURTIS, Columbia County, Wis.

Sixth Paper.

Loss Sustained by Dairymen.—At the late Farmers' Convention at Madison, Mr. H. C. Adams gave a very instructive address on dairy matters, the prominent feature of which was the great loss sustained by the erroneous practices of those having charge of farm dairying. My rememberance is that, by a careful computation of statistics, he made the anual loss for the past year to exceed $3,000,000. Major Alvord, in his address at a similar convention two years ago, stated that more than one-half of the butter offered for sale in the great city of New York, was bad—so bad that it was unfit for table use.

Why are Prices Low?—For the last few years I have noticed that the market reports of our large cities have quoted butter at about thirty-two cents per pound down to eight cents, and some times even lower. The natural inquiry then comes up: "Why this wide range in prices?" It is not wholly on account of the quality of the milk from which the butter is made, for we find that good milk is susceptible of being made into bad butter. It is not on account of the labor involv-

ed, for it is much less labor to make a first class article of butter than it is to make the villianous compound we are complaining of. It is not necessarily on account of the want of information, for I take it upon me to say that it is my candid opinion that a more enterprising, persistent and philanthropic set of instructors never existed than Wisconsin's once little band (now a mighty host) of dairy reformers. They have been foremost on all proper occasions, to give the public the benefit of their experiments, observation and research.

How to Make Good Butter.—It has been shown in public addresses, in printed matter, in various forms, all freely pressed upon the public, that it has been and is not more than half the labor to make good, high priced butter, that it has been or is, to make this bad, low priced compound called butter. While this is incontrovertibly true, there is a difference of opinion as to how this labor is to be applied, to bring about the desired result.

One party claims that it can only be done by collecting the milk or cream in factories, where all the required facilities and skill necessary can be concentrated. Another party claims that, with few inexpensive implements, and properly directed efforts, a first class article of butter can be made upon the farm, equal to the demands of commerce. But this difference of opinion is of little consequence, for it is plainly apparent that all the output of the factories is good, and also that all the farm made butter, where the cream is raised by the "deep setting" process, and the butter churned and worked by the granular process, comes under the head of good butter. It is also apparent that these two processes of butter-making are mainly the only sources of good butter in the market reports, and that all this bad butter—more than one half of the butter that reaches the market—is made on the farm, and that, too, by processes which are double the labor of the simple improved process so many times described.

Old Style Butter-makers.—I will illustrate the position of the old fashioned butter-makers in this way: A few days ago I was accosted by a well informed farmer, who asked me what I was getting for butter. I replied, 30c. per lb. With a shrug of the shoulders, and a sickly smile, he said: "I should like to know how that is done." Said I, you were over to Poynette to the institute, were you not? "No," he replied,—"my wife don't take to the new fangled notions, and I could not afford to waste the time. Not only that, but my wife makes just as good butter as anybody, and it is sheer robbery for those merchants to pay only 16c. per lb., when they can get 30c." I replied, I do not believe these merchant have made a dollar a year on their dealings in butter; that they have really lost, and lost their character also as butter dealers by being compelled to buy and sell the inferior butter made by you and your neighbors. I pointed out to him some of his neighboring farmers who had no better facilities than himself, and who had adopted the improved deep setting and granular process. They were shipping there own butter and getting about 25c. per lb., net returns. They did not offer their butter to the country merchant, whose character as a butter dealer had been ruined—if he ever had any good character in that direction—but shipped it to a butter market, on their own responsibility. Perhaps at first they were a little discouraged by not getting quite as much as they expected, but they soon learned that they alone were responsible for the quality of their product, and soon

mastered the requirements of the market—a neat looking tub of butter, good, solidly packed and uniform in appearance when turned out of the tub.

Novel Way of Packing.—At the request of Superintendent Morrison, I have brought a tub of butter as an object lesson.

I take off the cover, turn the tub bottom upward and take off the tub. Now you can examine the butter. You will notice at this point of the butter the packing is imperfect. This was done to show you how imperfect packing looks in contrast with perfect work; which, I think, is plainly apparent in the rest of the butter. It is claimed that the nicest form in which butter can be placed upon the table is in a neat print, but it will be readily seen that butter in prints cannot be transported to distant markets, except at extra labor and cost, and at best they get mussy, while butter properly packed into tubs of this character, in refrigerator cars, is now transported as far as Philadelphia and New York, in about three days, in perfect condition The dealer or consumer can select the sized tub he wants, strip his tub, as I have done before you, and cut from it a block of butter fully as neat in appearance for the table as the nicest butter print fresh from the hand of the dairywoman. Then the tub can be replaced on the butter, using it as a cover, which, if kept in a proper place, will remain in good condition for a reasonable time. The dealer in butter wants the larger tubs to cut up for retailing. For these reasons, you notice why I am so particular to impress upon you the importance of solid packing in the tub.

How I Make My Butter.—There are doubtless some in the audience who would like to know how this butter was made. I keep about twenty-five grade Jersey cows, which come in mainly in the fall and winter. These are always put in the stable to milk, and also in inclement weather. I farm with a view to feed these cows well, but the past dry season so shortened crops that I have fed them in the stable, since the 15th of October, twice a day, one feeding of ensilage, two of straw, and ground feed composed of two-thirds bran and one-third oats and corn, ground, five quarts each, and warm water to drink. I think it safe to say they never did better or looked better than they do at the present time.

Setting the Milk.—Our custom is to milk about twelve hours apart, taking with us cans to hold the milk. This is brought to the cistern near the house, where it is strained into cans eight and one-half inches in diameter, and twenty inches deep, with bailed handles and close covers. These cans are lowered into the cistern, four at a time, by a windlass, which rests on the curb, and is held at any point with a racbet wheel. The cans are filled to about three inches of the top, or so they will float. The cistern is about fifteen feet deep, and holds about one hundred and fifty barrels. It is filled from the well, one hundred and ten feet deep, by a windmill. The stock of the farm is mainly watered from the cistern by a large hand pump. This keeps the water in the cistern always fresh and cold. I have never known the water to be warmer than 55° in summer, nor colder than 40° in winter. This insures what I claim to be about as good a temperature and as little labor for creaming the milk, as can be obtained by any method.

Skimming.—The milk remains in the cistern between milkings, and is then removed to the house where it may be skimmed at once or remain longer unskimmed.

Churning.—The cream is kept in a tin vessel, and is stirred when new cream is added, when it is kept until it acidulates—until it begins to thicken. Then it is churned in a rectangular churn, at a temperature of 62° by a floating thermometer, to granulation. The buttermilk is then drawn off and well water is introduced to wash out remaining traces of buttermilk.

Salting.—The butter is now in fine particles; just in the right condition to salt. How much salt is now the question. If the salt is good dairy salt (none other should be used), there is little danger of getting in too much, provided you do not get in more than will dissolve.

This butter was made in a fifteen pound churning, and a heaping pint bowlful was used, which is as much again as was needed to flavor the butter; but it was added to the butter in a moist state; incorporated well through it by a few turns of the churn. It was allowed to rest about four minutes, when the churn was revolved and the butter worked into a mass, at which time some two quarts of strong brine were found in the churn. The butter was then packed solidly in the tub with a common butter ladle.

It was once held, and is still held by many, that butter must be held over some twelve or more hours and re-worked before packing. My reply is, here is the butter made as I have described; find fault with it if you can. I court criticism, and am ready to explain more fully any position I have taken in this paper.

MY EXPERIENCE IN DAIRYING.

By C. P. GOODRICH, Jefferson County, Wis.

Seventh Paper.

Selling Fertility.—The year 1872 found me the owner of a small farm. At last my debts were paid and I had a clear title to the land. This had been accomplished by grain raising, and I found that I had been slowly selling off my farm, a little at a time with each load of grain hauled away, until its productiveness had been so much reduced that it required the closest economy to make my income from it sufficient for my necessary expenses. The prospect was not cheering. My farm was gradually growing poorer; I earnestly wished to give my boys better opportunities for gaining an education than I enjoyed in my youth; my health had failed. It was plain that if I was to accomplish anything, a change *must* be made. I must use my brains if I had any.

A Start in Dairying.—About this time some were turning their attention to dairying. I had not thought very favorably of the business; had kept as few cows as possible, just enough for my own use, two or three usually, and deplored the necessity of keeping even these. In fact, I did not like cows—

could see no money in them. But a cheese factory was started in the neighborhood, and thinking I might get a little something out of it, I increased my number of cows and patronized it in summer, and during the fall and winter made a little butter, (which was sold at a very low price at stores and groceries), and took my pay in goods at a very high price. On looking over my books, I find that the year 1875 was the first that the income from my cows was enough to make me think it worth my while to keep an account of it. That year the total proceeds from nine cows were $348, a little more than $38 each. It was said I had done well. It certainly was something. I had received pay for keeping the cows, as I kept them then, and a *little* besides to go toward paying for the work of milking, etc.

Variation in Prices of Butter.—Circumstances soon occurred that opened my eyes wide. In the fall of 1875, after the cheese factory had closed, I went into partnership with a friend living in Philadelphia. We scraped together a few hundred dollars with which I was to buy butter and ship to him and he was to sell it. Not considering myself a judge of the article, I relied mainly on the word and character of the maker. When the account sales came, I was astonished at the great variation in prices of the different makes.

Secret of Good Prices.—Of course, after this, I tried to buy so as to make something. I shipped to different markets—New York, Boston and Chicago, and still this great variation occurred. One man's make sold away above others in every market. I have just been looking at one of those old account sales, and find that the prices ranged all the way from 15 cts. to 32 cts., and this particular make was 43 cts. per pound. Our own make was 30 cts. This was in March, 1876. My wife and I examined the butter closely, and for our lives we could not see that the butter that sold so high was any better than much of the rest, or any better than our own make. But there was more money in it, sure, for it cost no more to make it, and I was bound to find out the secret if I knew enough. I showed the maker the account sales, and asked him if he could tell me the reason of the difference in price. "Is it all a fancy?" I asked. He said: "You may call it a fancy if you like. My butter is made to suit the fancy of those who are able and willing to pay good prices for what suits them." At my request, he gave me particular instructions as to how his was made, all the way from the care of the milk, the time to skim, ripening the cream, churning, working and packing the butter. I went home and told my wife what he said. She was enthusiastic to try to make butter that would sell for something. We went at it, and soon prices began to mend. I went to reading everything I could get on the subject. Took dairy papers, from which I learned much. Especially was this true of the dairy department of the Jefferson County Union, now Hoard's Dairyman. In the spring I built a small milk house near the well, detached from the dwelling, and we made butter all summer. I visited many of the large creameries in my part of the country to learn the best methods. I have ever since been studying and learning, and have attended nearly all the dairy conventions, trying to keep up with the times, and have not learned all yet.

Money in Butter-Making.—The year 1886, the proceeds from the same nine cows footed up $696.42, an average of $77.33 per cow. I now knew there was money in butter-making.

Setting the Milk.—The first summer I set the milk in common ten quart

pans, set in a sink which extended around three sides of the room, and would hold water. Cold water was pumped in after each milking, which cooled the milk sufficiently to make the cream rise. This worked well, but was a great deal of labor. Since then I have put in improvements and fixtures at some little cost that have reduced the labor to, I think, about the smallest point.

Profit from Sixteen Cows.— For the past ten years I have kept from 12 to 16 cows, and have averaged, for the past seven years, over $1,000 a year net proceeds from the sale of butter alone. Last year it amounted to $1,243. By careful testing of cows, selection in breeding and better feeding, I have managed to make my cows produce more each succeeding year, until last year my mature cows produced an average of 357 pounds of butter each, and total proceeds of $107. I find that the better I feed the more profit I make, using, of course, what judgment I have and what knowledge I can get as to the proper kinds of feed for milch cows.

Feeding Bran.— I have fed bran for the last two summers, even when the grass was the best. I must tell you how I came to do that. I had always contended that good grass, and plenty of it, was a perfect food, and could not be bettered. Of course when pastures were dry and poor I had always fed grain. In May, 1886, the grass was good when I turned my cows out to pasture, but not wishing to change too suddenly, I continued the bran for awhile. They were giving then 400 lbs. of milk and making 18 lbs. of butter a day. I then gradually left off the bran feed and, in a few days, the amount of butter had dropped to 15 lbs. a day, although the amount of milk continued to be 400 lbs. It occurred to me to try the effect of feeding bran again. I fed 100 lbs. a day, and soon the amount of butter was again 18 lbs., although the daily amount of milk was still unchanged. The value of the bran I fed was 60 cents a day, and the three pounds extra of butter was 60 cents. I was getting pay for the feed as I went along, and reasoned that the cows would do better the next fall and winter on account of being kept in better condition. I am sure that was the case, for the yearly average per cow was increased, I believe, fully 50 lbs., owing to feeding an extra half ton of bran, so that for every dollar laid out in extra feed I got back two dollars.

Profits of the Farm Increased.— Now, this $1,000 and over received for butter each year is certainly that much added to the net profits of the farm, for the income from the sale of other farm products has, for several years, been enough greater than formerly to pay for the extra labor caused by the dairy. This is due to the increased fertility of the soil. Besides, a little ready money coming from the dairy has enabled me to make some needed improvements, among which is tile draining some wet land which was nearly worthless, and is now the most valuable and productive I have.

I cannot, in the short time allotted to me, go into all the details of how I have learned to manage my cows, handle the milk, and manufacture and market the butter, but I have given you a brief outline of the main facts.

Make a Start in Dairying Now.— My talk is not directed to those of you who are already successful in dairying and are, of course, prosperous and happy, nor to those who are making a success in other lines of farming but to the scores of you (and I know you are here) who are in the fix I was 13 years ago. And some of you are, in some

respects, worse off, for your farms are loaded with mortgages that are piling higher and higher each year, and you will soon be buried out of sight unless you do something different. I would most earnestly urge you to make a start in dairying *now*. Build a tank, set it near your well, make a shelter over it. get a few cows, and you are started; all this will cost but a trifle. Get a few more cows; but if you don't feel able to do that, take good care of and feed well those you have, and in a few years you will raise some good ones. But the most important thing is to learn the business. You must read and study and find out what others have learned. Lay out $10 in dairy literature. Ten dollars is a very small sum; you have only to leave off an occasional cigar, or some other useless luxury, and you have it. Learn all you can and do the best you can. If you have 100 or 120 acres of fairly good land, you will, in a few years, be able to add $1,000 net to your yearly income, and be making your farm better all the time. Your wives will help you, I know they will, and be glad to do so if you will only give them a chace and furnish some conveniences. What does an added $1,000 a year mean? It means paying your debts, educating your children, improving your surroundings and, if you choose, laying something by for a time of leisure and rest, or old age. *I know you can accomplish this.* If you ask me how I know, I can give you the best of evidence: *Because I have done it.* You have just as good ability, if you will only use it, and most of you are able to do three times the manual labor that I am.

ECONOMY ON THE DAIRY FARM.

By S. B. MORRISON, Jefferson County, Wis.

Eighth Paper.

Capital and Credit Needed.—In these times of low prices and poor crops we hear so much about economy, and the farmer who has obligations to meet must practice it rigidly, that we dislike to hear even the word mentioned; but the economy which I shall discuss is not the penny-wise and pound-foolish plan so often pursued, but the wisest distribution of forces for the accomplishment of certain ends. It is nearly impossible for the poor man to economize, for he must do as he can, not as he would like.

It requires the combination of capital and good credit to manage the farm economically, and how foolish it seems to see one go deliberately at work to destroy his credit, which, when once lost can not be regained.

Such an one is controlled by circumstances, whereas he should, in a certain measure, control them.

Use Business Methods.—The far-

mer's only hope is to use the best business methods in the management of his business; we can't form a monopoly or a trust, for it is such hard work for us to get trusted.

Experience the Best Teacher.—The few thoughts which I shall endeavor to present are suggested mainly through the line of experience. Experience is a dear school, but it is said that a certain class of persons can learn in no other. The lessons that I have learned in this school are very dear to me—some of them cost me a hundred dollars, and I prize them highly because they were so dear.

About five years ago my father gathered me about his knee and called my attention to the desirability of my possessing the ancestral acres. He said he would sell the same to me and take my note, provided I would pay him an interest equal to the amount invested in government bonds. I remarked that the bonds were about 12 per cent. above par and my note, with liabilities $10,000, and assets $2,000, would be about 25 per cent. below, so that the latter would be the better investment. Of course, being a shrewd business man, he saw the advantage, and the farm was mine.

Marketing Butter.—The farm being well adapted to dairying, I determined to make the butter product a specialty. Learning that the parties who supplied the Tremont House, Chicago, were not sending them enough, the steward, after trying a sample tub, said he would take all I made; but there are two dull seasons in the hotel trade, and during these times I was obliged to send to commission merchants. This was quite unsatisfactory. So I went down to Chicago, among the employees of Lyon & Healy's music store and fixed it so that when I did not send to the hotel I could pack in 25 lb. tubs and send to them, charging about Elgin quotations, saving freight and commission. The last two years the Tremont has taken my entire make, paying highest quotations and no commission. I think that in the five years, I have saved $200 per year by handling my own butter. A small amount of butter is marketed in this way compared to what might be, if the farmer would only pursue business methods. St. Paul, Minneapolis and the large towns in the northern part of the State offer good home markets to the farmers living near.

City and country are not as far apart as they were 25 years ago, owing to the increased mail and traveling facilities. I could mention farmers living near Ft. Atkinson, Whitewater, and Elkhorn, who supply families in these small towns at from 25 to 30 cts. a pound per year. As our towns increase in wealth, good butter is wanted to go with the other good things, and people are willing to pay for it.

Last summer Mr. Flack, of Elkhorn, sold butter to farmers who took their milk to the factory, and to day-laborers, for 18 cts. per pound, the parties furnishing the jars, when Elgin was only 17 cts.

Good butter has paid better the last five years than any other farm product.

Good Farm Labor.—The question how to secure good help upon the farm is as serious a question as any with which the farmer has to deal. The discontent among laborers which characterizes the present age is by no means confined to the cities. We feel it just as much upon the farm, and while wages are higher, the help is more unreliable and the work more unsatisfactory than ever before. Now, the farmers are at fault for this state of affairs, and I am convinced that the system of hiring men for eight months in the year, and

then turning them adrift, is a vicious one, and so long as we do this we will have trouble enough.

How to Secure it.—Bring dependent upon hired help, we soon found ourselves at their mercy, and that if one was dissatisfied, he could not leave without stirring up a rumpus among the others. We were on the ragged edge most of the time. A tenant house seemed the most feasible way out of the difficulty, so we built a small one, and the tenant is now on his third year. His wife helps milk and is always ready to assist in the house when the festive hired girl skippeth out. This plan has worked so well that we think strongly of building another tenant house, and doing away with the girl altogether. It costs nearly a dollar per day to keep one, and when they are needed the worst they have business at home. A large number of tenant houses have been built in our vicinity, and I have yet to hear of a person who is not pleased with the system. Hire a good industrious foreigner who has been here long enough to get the smart off, and he becomes attached to his little home, is always there, takes an interest in farm matters and is worth two ordinary hands. There are more parties wanting houses than there are houses, so it gives a man a chance to pick his men, and hire none but who can give a good recommendation from the place he has left.

Hire in the Spring.—If we hire the man in the spring, he can't leave in summer, for he must then forsake his garden, potatoes and corn, and in the fall, with a long cold winter before him, what else can he do but stay? Think of this oh ye men who chase from Dan to Beersheba for hired help, and see if, by using a better method, you can not have plenty of help the year round! It takes a large burden off the farmer's wife, who has enough to do to raise the family without running a boarding house beside, and that without sufficient help.

Farmers' Wives Work too Hard.—The young farmer with a mortgage on the farm thinks that he can't afford to keep help in the house; so the wife and mother is compelled to rear the family and do all the work besides. Now one or the other is neglected, and the good doctor's bill tells better than I can whether it is economy. It sometimes looks as though farmers' wives were harder worked and poorer paid than any other class of women whose husbands are worth what the farmers are. The farmer has one method by which he can curtail expenses, and that is by the plea of "hard times;" he can always fall back on that.

Make Your Wife an Allowance.—In dealing with the city people, we found that most of them allowed their wives a certain amount for household and personal expenses. We have found that this works just as well on the farm as in the city. With a certain amount of ready money at the beginning of every month, the good wife can take advantage of baits thrown out by enterprising merchants and can run the house 25 per cent. cheaper, than in the old way. Then everything is squared up, and we don't get as many statements as we used to, and if she does her work alone, she receives the benefit. She also learns how to handle money, and going to town to spend it is a change from the ordinary routine of house-work.

Buy Feed in the Fall.—We have also found that it is economy to purchase feed in the fall for winter's use. Bran could be purchased last fall for $12, and in three months it was $16. Now this is a saving of 33 per cent. for three months by purchasing early, or that much loss by

waiting. A year ago last fall I bought bran for $10 per ton, and in four months it was $16, a saving of $6 per ton, and the interest (33 cents) for the four months. A merchant, by paying cash saves a small per cent. by so doing, and it is accounted the correct business method, and the one who can't do it can not compete with the one who does, margins in trade being so small; but the farmer who has a chance to save from 33 to 50 per cent., and often more, by buying early, and then grumbles at the hard times, would grumble if he were to be hung.

Ensilage Corn.— Two years ago I planted about one acre of ensilage corn, and thought last year to plant about five; but the pastures began to dry up with no prospect for hay, and I kept planting until I had in twelve acres. I did not tell anyone for fear they would call me a fool. This may seem strange, as I live only two miles from the center from which eminates all dairy intelligence, also headquarters for the ensilage corn, and a truer example of the truth of the scripture which says that, "a prophet is not without honor, save in his own country among his own people," could not be found, and while orders came in for hundreds of bushels from abroad, I was ashamed to say anything about my little patch.

Most of the farmers did not take any stock in "this institute talk." Some of them had farmed it "nigh on to forty years," and they did not want Hoard and John Gould to tell them how to farm it. About July, when it became apparent that the fine field of corn was ensilage corn, even my enemies admitted that for once I had done the proper thing. I began in July and fed 75 cattle and horses, 40 being milch cows, nothing else but bran and a little North Star corn, until January. I had hay enough till April 1st and enough corn to carry me till grass comes. It being equal to tame hay for feed, at prices for hay this winter, it would have taken $500, and where could I have borrowed the money to pay for the hay?

Feeding Corn.— I feed considerable corn to my cows, but do not husk it— just bind and stack it and cut when needed, and in this way save from 12 to 15 cents per bushel over the old way of husking and grinding. I refer to common field corn. The ensilage corn was drawn from shock as needed. It would have been more economical to have placed it in a silo. By running stalks through the cutter, I made them eat up every bit. The cutter and tread power have more than paid for themselves this winter.

I used to pay 40 cents for my 60 lb. tubs and 30 cents for tub staples, but by looking around some I was enabled to get tubs for 25 cents and staples at 14 cents per pound.

I have tried to show that the judicious use of ways and means at the right time is the greatest economy, and that to withhold them results only in loss. We are prodigal in the use of our muscle, but when a problem presents itself which requires mental effort, we shirk from it as a dairy editor from milking cows.

EXHIBITIONS AND PRIZE BUTTER.

By Prof. JAS. W. ROBERTSON, Guelph, Ont.

Ninth Paper.

Value of Exhibitions.—The trend of action and the usefulness of many of the agricultural societies, during the past ten years, has been mainly in the direction of holding fairs or exhibitions. Some writers and speakers have been severe in their censure of the responsible directors for permitting or encouraging that *one aspect* of all the work, ostensibly undertaken by these societies, to so effectually monopolize their funds and energies. On the other hand, it should be recognized and remembered that the stimulus of healthy, hearty and friendly competition which they have fostered has been very beneficial.

Every department of farm work, even on the farms whose tillers are most remote from educational influences, has felt the quickened pulsations of life from the intensified circulation of knowledge resultant from exhibitions. Few farms are now isolated from such aid by reason of their geographical location; but many are still out of reach, because of the sad, secluded mental attitude of the men and women who live on them. If a man or woman, a boy or girl, can be enlivened into a fair competition with others of their fellows in any branch of their work, a great economic boon will have come into their lives. In this I see a bond of union between the *purpose* of Farmers' Institutes in their work of informing, instructing and educating those engaged in agricultural pursuits, and the *plans* of agricultural societies in providing exhibitions for comparing attainments through open competition.

Preparing for Exhibitions.—The work of preparing for the summer and autumn exhibitions will be engaging the thoughts and hands of many farmers' households by the time the readers of your bulletin see this. I could wish that such an interest were more general and intelligent. The cattle and horses of those intending to show will be specially "fitted up," which unfortunately too often means the "breaking down" of excellent qualities by excessive fattening.

How to Make Prize Butter.—Roots and fruit for display will have befitting care and concern bestowed upon them. The boys hardly in their teens will be doing their share of the bragging about the colt, the calf or the lamb, and already in the innocent glee of boyish greediness, fingering in imagination a red ticket for each animal. The girls *not yet* in their teens will be interested in everything generally, with all the young girl's wonderful capacity of expectation; while the daughters *not now* in their teens will be—well I won't leave my ignorance open to caustic criticism by trying to guess what they'll be doing. However, in the anticipation of the same—the exhibitions, not the criticisms—I will try, with all due modesty, to give those of them or their mothers who may be thinking of how nice it would be to take the first prize on butter at one of these

exhibitions, some helpful information on how to do it.

Rule I.—See that the cows have an abundance of good wholesome feed. Supplement the grass with bran or grain. Corn and peas make firm butter. If grass be dry or scarce, furnish green fodder besides. The quality of the feed determines to some extent the quality of the fat globules in the milk. Fine butter is mostly composed of these globules. Green fodder is fed with better effect on the quality of the butter after being *wilted* for a day or two. This is especially the case with clover.

Rule II.—See that the cows have a liberal supply of pure cold water. As well might a cook expect to make good palatable porridge out of musty oatmeal and stagnant water, as to get pure, sweet-flavored, wholesome milk out of musty feed and foul drink consumed by a cow.

Rule III.—See that the cows have access to salt every day. They know best when to help themselves.

Rule IV.—If there be not sufficient shade in the pasture-field, the cows should be tied up in a darkened stable during the heat of the hot days. I believe in soiling.

Rule V.—Let the cows be saved from annoyance and worry. Any harsh treatment that excites a cow lessens the quantity and injures the quality of her yield.

Rule VI.—Where practicable, let the cows be milked regularly as to time and by the same person.

Rule VII.—The udders should be well brushed and then rubbed with a damp, coarse towel before milking.

Rule VIII.—All milk should be carefully strained immediately after the milking is completed.

Rule IX.—Thorough airing of the milk for a few minutes by dipping, pouring or stirring will improve the flavor of the butter.

Rule X.—When set for the rising of the cream, milk should be at a temperture above 90° Fahr.

Rule XI.—When shallow, open pans are used for setting, it is most important that the surrounding air be pure. A damp musty-smelling cellar is not a fit place for milk.

Rule XII.—When deep-setting pails are used, the water in the tank should be kept below or as near 45° as possible.

Rule XIII.—The skimming should not be delayed longer than 24 hours.

Rule XIV.—Cream should invariably be removed from the milk before it is sour.

Rule XV.—The cream for each churning should be gathered into one vessel and kept cool and sweet. A good practice is to mix 25 per cent. of pure water with the cream.

Rule XVI.—The whole of the cream should be well stirred every time fresh cream is added, and half a dozen times a day besides.

Rule XVII.—Two days before the churning is to be done, about a quart of cream for every four pailfuls to be churned (or two per cent.) should be set apart and kept as warm as 70° Fahr.

Rule XVIII.—Then one day before the churning, that small quantity of cream — (a fermentation starter which then will be sour enough)—should be added to the whole of the cream intended for churning and well mixed therewith.

Rule XIX.—The cream should afterwards be kept at a temperature of 60° Fahr.

Rule XX.—During summer the best churning temperature is 57° or 58°. During late fall or winter 62° to 64° are found to be better.

Rule XXI.—The agitation of churning

should be kept up till the butter comes into particles rather larger than clover seed.

Rule XXII.—The buttermilk should then be drawn off and pure water at 55° added in its place.

Rule XXIII.—By churning this for a few minutes the butter will be washed in the churn in its granular state.

Rule XXIV.—The milky water may then be drawn and replaced by a weak brine at the same temperature viz: 55°

Rule XXV.—After a minute's churning the butter may be removed from the churn and pressed for salting.

Rule XXVI.—Pure salt of medium fineness and with a body velvety to the touch should be used.

Rule XXVII.—Three-quarters of an ounce to the pound will be the right quantity for most markets and judges.

RuleXXVIII.—The butter should be kept cool during the working, and also during the few hours while it may be left for the salt to thoroughly dissolve

Rule XXIX.—As soon as the salt is thoroughly dissolved, the butter may be worked the second time to correct any streakiness which the first mixing of salt may have caused.

Rule XXX.—It should then be put up neatly and tastefully, with as *little* crimping or beautifying as feminine fondness for these will permit.

Rule XXXI.—It will then do its maker credit and if it does not receive the first prize, it will be prized and praised by its eaters.

Hints on Winter Dairying.

The following letter from Mr. L. N. Brown, Gurnee, Ill., which contains some good suggestions, was read at the closing institute, Mr. Brown being unable to be present:

Winter dairying, I think, could and should be much improved. There are but few winter dairies in Northern Illinois and Southern Wisconsin that more than pay expenses.

I will make one suggestion. Let your meeting chose a dairyman who has all his cows fresh in milk next November. Let them be divided so that each half shall be of the same milking quality. Keep one-half in every respect as the average dairyman keeps his cows. Let the other half be kept in a warm stable. As the weather grows cold the stable should be heated with artificial heat and kept between 55 and 65 degrees. Do not let the cows leave the stable. Water them with water at 98 degrees; keep a true account of all feed and expenses for 90 days, and then see how the profit of each lot will compare.

Or try this way: Give each half the same amount of hay. Give the half kept in the warm stable just grain enough so the product will equal that of the others; then see if it will require over half the grain. I am satisfied that one-half the grain that is fed to winter milch cows is used up by cold. Cold is about as injurious to milk as frost is to corn.

Now, if your people will choose a dairyman who will try this experiment, try it fairly, and have the trial made public from week to week, it will do more to improve the dairies of this section than any one thing that I can name.

There are two faults with many dairymen of this section. First, the dairyman don't make dairying his business. Second, many of them don't do as well as they know how.

If every sober, industrious man will manage his dairy as I have mentioned, his note will be worth one hundred cents on the dollar.

In my forty years of dairy life, I have done much poor dairying; but I am now taking a wiser and better course.

EVENING SESSION—MARCH 29.

FARMERS AS BUSINESS MEN AND CITIZENS.

By Hon. H. C. ADAMS, Madison, Wis.

First Paper.

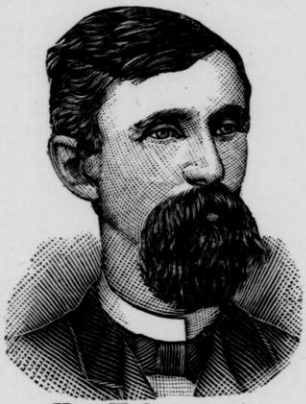
Hon. HIRAM SMITH in the Chair:

Man and the World's Work.—The business which a man has is not simply his means of getting a living, but is his part of the world's work. Each human life is a tack, a nail, a spike, a cog, a bolt, a lever, a walking beam or a band of steel in the inter-dependent machinery of the world's business. Only when all the parts are perfect will we be able to dispense with that costly governor called government. It is the business of the State to look after the business of its citizens that it may have less business to do. When labor and thought are linked together in every phase of our industrial life, we shall have less grit in the machine and more gold in its product.

A business man, unless misnamed, is thoughtful, methodical, persistent, industrious, ambitious, and above all things, honest. He understands thoroughly the fact that coiled up in his head is the mainspring of his business. He will run in a rut as long as anybody while it pays, but when it fails to pay out he goes, if it loosens every screw in the machine. He is neither morbidly courageous nor superstitiously cautious. He is a man who has reason, and out of it gets reasons. Sink or swim, he plants his feet on his judgment and stays there. Many men in business have only a few of the symptoms of being business men—hence, failures innumerable along all the lines of trade and commerce, in the professions, on the farm, in the domain of art and poetry where men think that the eagles of their imagination can lift them above the laws that underlie success in the winning of bank accounts and of homes.

The World Thirsty for Money.—The world is hungry and thirsty after money. It likes the men who get what it likes. The modern hero is shod with a business suit. The coat of mail has gone to the museums. The tyrants of to-day shed blood under the forms of laws and in the white light and with the *sanction* of a christian civilization. Their palaces of trade should be corniced with grinning skulls and their chambers of commerce frescoed with broken hearts. The love of money is the root of some evil and much good. It is drawing the love of war from the minds of men; it is tying nations together with chains of gold; it has stimulated invention and lessened the burdens of labor; it has peopled this continent, builded its cities and made its country homes. It is an honorable love, and no man need be ashamed of it.

There is no essential virtue in poverty. The strong man poor is a giant in chains; the strong man rich is a giant free to do the world's work and his own. Poverty brings bent bodies and warped minds; it causes more divorces and more heart-burnings, more suicides and more murders, more hatred of men, society, government and God than all of the jingling curses that rattle about the heels of wealth. We want less



HON. H. C. ADAMS.*

poverty and more wealth on the farms of this country. We want a condition of things where the American farmer can save more and spend more We want him to have the luxury of time, of rest, of recreation, of social enjoyments, of literature of those beauties of art which in the homes of any people shape in a degree both the souls and bodies of their children. These things can be obtained for money. Money can be obtained on the farms as elsewhere by good business men. It is idle bosh to say, as men do say, that little or no money can be made in legitimate farming in this State; that farmers as a class are losing ground. The first part of the statement is disproved by the success of hundreds of farmers in all our agricultural counties, from Hiram Smith in Sheboygan to A. O. Fox of Dane; from A. A. Arnold in Trempeauleau to Chas Miller of Rock; from J. M. Smith in Brown to T. J. VanMatre of Iowa; from John Linse in La Crosse to H. S. Weeks of Waukesha; and from examples in every country neighborhood in Wisconsin, where men are becoming independent from the profits of their farms.

Farmers Not Growing Poorer.—It is not true that farmers as a class are growing poorer. The prosperity of any class is safely indicated by the appearance of their homes. Go anywhere in this State to-day in rural neighborhoods and you see better fences, cleaner fields, more ornamental trees and shrubs, broader barns better painted, more tasteful and commodious houses than you saw ten years ago. We raise just as much wheat per acre as we did then, and can buy more things with the money we get for it. We are making more butter per cow, more meat per steer, more pork per hog in the same time than we were then.

Lessons for the Farmer to Learn.—The Wisconsin farmer is a better business man than he was ten years ago, but he has many lessons yet to learn of the sharp men who run railroads, factories, stores and banks. He must understand the value and character of credit, and not be superstitious about debt. An endless amount of twaddle is preached about the horrors of debt. Some capitalists carry a placard in one

*Hon. H. C. Adams was born in Verona, Oneida County, N. Y., November 28, 1850, and came with his parents to Wisconsin in 1851, settling at Ft. Atkinson. In 1855 he removed to Beaver Dam and thence to Madison, his present home, in 1857. He received a partial collegiate education at the University of Wisconsin; was elected member of assembly for 1883-4, and re-elected for 1885-6.

Mr. Adams is a farmer, living on his farm adjoining the city limits of Madison, where he owns a dairy and small fruit business; has been in the institute work since its inaugeration, and is President of the Wisconsin Dairymen's Association.

hand saying do not run in debt while with the other they slap a mortgage upon every man who comes within their reach. The agricultural press dribbles homilies about going in debt from January to December, while nine out of ten of these very papers would not have been born at all if it had not been for a debt. Lecturers upon farm topics invariably season their remarks with sage injunctions about avoiding debt as a plague. Any gathering of farmers will cheer a man to the echo who can pile up a good rhetorical climax of denunciation of the practice of buying more than can be paid for. And yet there is not one farmer in one hundred in Wisconsin to-day who did not get his first title to a home through a debt. They are men who came here with a capital of ambition and industry, ran in debt for their farms, took their risks like men and fought their way out to independence and comfort. It is not business-like for these men to "scorn the base degrees whereby they did ascend." It was a long and bitter struggle for many of them, but the fight was not against debt—it was against poverty. The business farmer should look upon credit as a part of his assets; as something to be drawn upon when profit seems probable. Debts differ. To go in debt for productive property is one thing; to go in debt for unproductive property is quite another thing. To buy land for less than it is worth, to buy stock which can be fed or sold at a profit, to hire labor needed to make or save crops, to buy machines that save expense, to buy fertilizers to maintain fertility of soil—these things make business-like debts, debts that are the eggs of profit. But for the farmer to run in debt for fast horses and costly buildings, for stock that he does not understand; for enterprises outside his business over which he has no control; for costly apparel and furniture for his family that they may move in social circles which regard these things only—these are unbusiness-like debts and are the eggs from which are hatched failure and dishonor. When credit is to be used, let it be in a straightforward way. Floating debts and store debts are abominations. The farmer who forces a merchant to carry him deserves a rough ride and generally gets it. Banks are made to loan money. The farmer has no business to force the men with whom he deals to borrow money because he does not pay it. Let him get his money where they make a business of loaning it, clean up his scattered accounts and then redeem his paper promptly on time though the heavens fall. Men then look upon him with respect. What is better, he can look at himself with respect.

A Debt to Folly.—A farmer can contrive one debt which never can be paid. It is a debt to folly, to be foreclosed by misery and disappointment every day of his life; a debt which will eat out his heart and scorch his soul; a debt which is incurred when his judgment goes into bankruptcy and he goes into the business of farming in opposition to his own tastes and inclinations. It is hard enough to win success in any calling when the whole bent of a man's mind is in the direction of his business. It is doubly hard when the mental drift is the wrong way. It is like scaling a rock feet foremost. Dean Swift well said: "No man ever made an ill figure who understood his own talents, or a good one who mistook them," and Sydney Smith gave the idea a little more emphasis when he wrote: "Be what nature intended you for and you will succeed—be anything else and you will be ten thousand times worse than nothing." The only difficulty with this kind of wis-

dom is that it does not apply to that very large and unfortunate class of men who have no special bias for any particular pursuit, and drift into the different channels of human activity upon chance currents. For these men there is this consolation on a farm: They are there more completely masters of their own fate than in any other line of business. Cyclones and drouths may come, but they do not as a rule—they are exceptional, and the last has been a blessing rather than a curse to the business farmers of the Northwest. Whether a man has a predisposition for farming or not, he will develop a preferance for certain branches of the business as he continues in it. Those tendencies should be followed religiously. They will make the farmer a specialist perhaps. It is to be hoped they will.

Specialties.—The specialist understands one sound principle of business at least—it is easier to ride one horse than two; a rifle is a better weapon than a shotgun; the point of a needle can be driven deeper than the head of a stick; a burning ounce of oil makes a gallon of water warm, a quart simmer and a pint boil. Men are dropping into specialties everywhere as the world becomes older, richer and smarter. Years ago men could be found who made watches entire, or a whole pair of boots, or a carriage from bolts to cushions. Go into the great factories now. You see men who do nothing but sharpen tools for others to use; who do nothing but drive rivets; who do nothing but rub spokes year after year; who, upon a simple trifling act, constantly repeated, spend the energies of a lifetime. The general-purpose man who can do everything goes down before the deadly competition of the man who can do one thing.

In Law.—The drift is in the same way in the professions. Lawyers are labeled railroad lawyers, criminal lawyers, divorce lawyers and advertise themselves as specialists in the laws of inheritance, in commercial law and in all the branches of legal business. They are paid, not for running tilts on all sorts of horses in every direction, but for a trained effort in one direction.

In Medicine.—The same thing is true in medicine. If all the good doctors are not specialists, to a man they would prefer to be. They know enough to know that the intricacies and variations of the human organs, and the laws that underlie health are too vast for any one mind. They may be general practitioners, but they send very bad eyes to the occulist and useless ears in the same direction. The complicated case of nervous derangement goes to the man who treats nothing but diseases of the nerves. The specialist in medicine runs from the corn doctor to the dismal creature who claims to know all the mysteries of the human heart. These things are so because the world wants better service and is willing to pay for it.

On the Farm.—What is true elsewhere in this line is true on the farm. Concentration of purpose and of talent is as important there as anywhere. It is urged in objection that remarkable talents are needed to run specialties on the farm; that the average farmer does not know enough to be successful in this way. Is not the objection a poison to itself? Does it require as remarkable talents to do one thing as to do half a dozen? Does it require more capacity to be a dairyman, or a fruit-grower, or a beef-producer, or a raiser of swine, than to represent successfully all four interests in one? Can one of the parts be greater than the whole? If so mathematics and common sense should be tied up together and plowed under. The farmer ordi-

narily makes the most out of that part of his farm work which he likes the best. Why should he not conform himself to that part? Drudgery and mental friction make men old when they might be young. They curse the man who is afraid to follow his own tastes.

The farmer should have the business sagacity to see that when these things are at the maximum a strong partnership is formed between grey hair and empty pocketbooks. Farmers have plenty of talent—more than they think, more than other classes suppose them to have—but very few are broad enough and deep enough to properly manage all branches of farming.

Faith and Enthusiasm.—Men have made money at mixed farming. They make money in Mexico to-day plowing with a stick. It proves nothing. The specialist has almost invariably that most vital quality of a good business man—enthusiasm—an enthusiasm born of faith. Faith may be a good thing in religion; it is a ten times better thing in business, cynics and "I told you so" people to the contrary notwithstanding. The man who enters into his work on the farm with enthusiasm has a place there. Communities respect men who believe in what they do. The namby-pamby dawdlers who stalk up and down the streets of cities and in country places sneering at enthusiasm, and ridiculing the ardor of men who love their work are the "sheeted dead who squeak and gibber" in our modern life. They are not business men.

Men Who Attract Attention.—The men whose thought and work are attracting the most attention from the agricultural minds of the country are specialists. The mixed farmers of Wisconsin, while objecting to specialties in farming, are glad to receive special instructions from Prof. A. J. Cook, of Michigan, about bees, from Charles P. Hamilton about blackberries, from The. Louis and Geo. Wylie about swine, from J. M. True and H. D. McKinney about horses, from J. C. Kiser and George Harding about cattle, from F. C. Curtis, Hiram Smith and John Gould about dairying, and from W. D. Hoard about his splendid exposition of the principles of breeding, which has made the modern dairy cow. These men are all specialists. They have left no half-turned furrows over every lead which can be struck upon the farm, but have worked each his own vein and uncovered a great richness of knowledge himself. The Wisconsin farmer will be a better business man when he gives up his mission of trying to raise everything; when, to use a homely and well-chewed figure, he is contented to bite off what he can chew.

Important Tools.—The first tools which a business farmer needs are a pen cil and paper. The farmer who grows a crop should estimate the cost as carefully as the architect who plans a building counts its cost. It is farmer-like to guess, it is business-like to know. Thinking and figuring are deadly enemies of failure on the farm. Crops should be raised not as the result of jerky impulse but of careful calculation. A cash account should be kept as rigidly as the the sabbath day. What kind of business is that which cannot be introduced to its outgoes and income at the end of the year. Nine-tenths of the farmers of the country ought to take lessons in the matter of peanut stands and millinery shops. Many of them say that they are afraid to look a cash account in the face. It is a singular modesty which shrinks from bare figures. The business farmer will charge his cash account with every cent expended. If his expenses for tobacco or cigars are such that his wife can make odious comparisons between

his financial investment in smoke and in dry goods, make the charge to charity, for it is a charity to a man who is so poor in resources of enjoyment that he must smoke to be happy, to buy his cigars. I charge mine to charity. At the close of each month or year accounts should be drawn off and classified in a ledger under proper heads.

What Keeping Accounts Shows.—The farmer will then know exactly where his money comes from; he will not be obliged to pay bills twice; he will know what he has paid for clothing, for household expenses, for repairs and for improvements; for machinery, for labor, for seeds and plants; for stock, for the education of himself and family and the adornment of his home. If he is financially sick, he can tell what part brought on disease.

How to Spend Money.—The man who keeps a cash account thinks twice when he spends money. Robert Ingersoll has been cheered all over the United States because he said that if he had but a dollar to spend he would spend it like a king and not like a beggar. The antithesis is striking; the idea is as beautiful and as hollow as a soap bubble. The average business man is neither a king nor a beggar. He should ape neither the magnificent spendthrift airs of a monarch, whose bills are paid by the people, or the close-fisted wolfish manners of a beggar, whose bills the people pay. The American farmer gets money by hard work and hard thinking, and if he is a good business man he will spend thoughtfully what he gets laboriously.

Farmers Extravagant.—Farmers are extravagant. They are as a class wasteful not of their money but of their time; of their energies of mind and body. Mental and physical strength and vital force furnish the most productive capital a business man can have. It is a kind of wealth which cannot be stolen but may be thrown away. That eight hour system on the farm which has been described as meaning eight hours work in the forenoon and eight in the afternoon makes small men and dead men; it makes women as narrow as their sisters who do no work; it makes boys and girls who look upon farms as graveyards of comfort. The farmer in ordinary circumstances should work and work hard with his hands. The flippant contempt for manual labor which lurks in otherwise vacant places in society should have no sympathy from him. But when all his force is used in muscular action, he robs his brain. He squanders the splendid chance which each man has of mental growth. The farmer in his business is dealing with all the laws which have statement and definition in natural science; he is dealing with not only the complications of those laws which make plants and animals but he is dealing with men, men who have minds sharpened in the keen contests of business life and broadened by the culture of schools and society. He cannot afford to measure himself by the standard of muscle, for in that case he must stand uncovered in the presence of that historic animal which spoke to Baalam.

Thinking Saves Working.—Thinking saves working. The thought of the race worked out in the application of steam to machinery is said to be doing each year the labor of 1,000,000,000 of workingmen.

The farmer who is a business man will never call anything "good enough" which can be bettered; he will have that splendid discontent which is looking and working for better soils, better crops, better stock, better buildings, stronger sense and more perfect character. On the other hand he will accept the inevi-

table, with the grace of that old woman who said that although she had only two teeth, she thanked God they were opposite each other.

Farmers in Politics—Every American voter should be a politician in the best sense. Our political system suffers because the business men of cities are timid and the business men of the country indifferent. The political bully weighs too much in municipalties. His country cousin, with better manners and a sleepless activity, has a wide-spread influence. The obligations of citizenship should make every farmer active in politics, not for the good of his class alone, but for the good of his country. It is not good citizenship for a farmer to neglect the primaries of his party and then growl about nominations; to keep away from the polls for lack of time to vote, and then spend days in the post-office or corner grocery bewailing the result of the elections. Good citizenship means an interest in, a knowledge of, and a devotion to the general welfare. With the farmer it means good work in the road district, and active thought and work to make township, county, State and national governments what in his best judgment they should be. He may be beaten by men of less brain and microscopic moral sense, but he is fighting under the American flag and for it, and he should surrender to neither fools nor rascals, though routed a thousand times. Men say they do not like to meddle in politics because the atmosphere of political life is full of moral poison. Why do they not stop business because of the tricks of trade, and the dishonesty of some business men? Why do they not forswear society because it does frequent honor to hollow hearts and hollow heads, when balanced with well-filled pocket books? Will the political atmosphere become purer by the absence of good men?

The men in this country who are too dainty to help govern themselves ought to pay taxes in Turkey and get justice in Russian courts. Certainly they should disguise their cowardice or laziness with thicker garments than professions of their own superior virtues.

Dignity of Labor.—The farmer who is a good citizen will never be oppressed with that nightmare of nonsense which pictures the tiller of the soil as carrying all the burdens of the world. A good citizen respects the rights and virtues of all classes and does not magnify those of his own. There is no more essential nobility about the business of working land than making chairs or cutting off limbs. There is as much dignity in driving a shoe peg as in hoeing a beet; just as much virtue in selling a railroad ticket as a strawberry.

Not one farmer in one hundred has as hard and laborious a life as a railway president of an average, first-class road. There is no dignity conferred by unthinking labor. Thoughtfulness and wisdom dignify all labor, whether of farm, factory or law office. A political party devoted to farmers' interests alone would be an abomination. Strong, moneyed interests have too great power in State and national legislatures; but a remedy which would set one class in opposition to all others would be worse than the disease. It is not farmers that we want in public life so much as men. It should be no reason that a man should be elected to this or that office because he is or is not a farmer. The old question—is he capable and honest?—should stand until the end of time as the only test. Manhood should stand above vocation. It is more important to know whether a man has brain or not than it is to know whether he pays taxes in a town or out of it. When farmers bring a strong intellectual life into their citizenship their interests will be taken

care of. They will never climb to a political heaven upon bubbles of bombast about their own superior virtues, or get any higher by pulling down other classes.

Justice to Public Men. — Farmers as a class will be better citizens when they do justice to public men. It is considered a proper thing in almost any gathering of farmers to speak of public officers as dishonest. This sentiment is contaminating all classes of people in the United States. We meet it everywhere. Every woman who reads an essay, talks glibly about the awful corruptions of the puplic service; the newspapers are filled with squibs and editorials aimed to unsettle belief in the integrity of officials. Rumors of corruption hover over every movement in legislation and government. The extent of this sentiment in the country is almost beyond belief. And yet there is not one *iota* of evidence to prove that the republicans and democrats who hold office in the United States to-day are not as honest and conscientious as the average farmer himself. They are not all honest, it is true, and a prismatic partisan press gets all colors from their acts, but as a class they represent a proper idea of what integrity in the public service means. If there is anything which will tend to make officials corrupt it is the continued insistance of the people that they are so.

Love Your Vocation.—The farmer who would represent that which is best in business and citizenship should love his vocation; he should carry into it enthusiasm and persistence; he should have knowledge; he should know men and things; he should be broad in his charity, strong in his friendly sympathies for other men and other classes; he should be loyal to himself, loyal to his class, loyal to his country, and, above all, loyal to the truth.

Tribute to Wisconsin.— This commonwealth of Wisconsin, with its laws, its schools, its institutions, its mills, its factories, its mines, its forests, its millions of cultivated acres, its populous cities, its happy homes, where children learn the lesson of labor and of love, its wealth of matter and its wealth of mind, is a splendid monument to the business ability and the citizenship of those men who, in an early day, came here to build for themselves homes in the Western wilderness. We should hold this splendid heritage and make it grander still with unselfish labor and a patriotism which shall do honor to their memory and lead our children to do honor to ours.

INDUSTRIAL EDUCATION FOR OUR GIRLS.

By Mrs. L. B. C. GAULT, Waukesha County, Wis.

Second Paper.

Our Work To-Day.—To live in the present age is to bear the burden of a great responsibility. All nature is instinct with progress, and humanity is struggling to outgrow the barbarisms of the past, and win its way to that higher and more complete development toward which the spirit of the age is beckoning. Our work to-day is different from that of ages past, for an advancing civilization has opened new fields for beneficent enterprise, besides awakening philanthropy. As our race climbs upward to a higher plane of thought and action, the imperfections of the past become more clearly discernible, and what then was all-sufficient is now out-grown, and the surest index of the true altitude to which civilization has attained, is the condition of its physically weaker half. A glance at the life of any nation is sufficient to reveal whether it still cherishes the barbaric belief that "might makes right," or has achieved that loftier eminence from which men become "soft to the weak, and noble to the strong," and regardless of the needs of all classes and conditions of society.

Ignorance and Inefficiency.—Penury, the child of ignorance and inefficiency, drives multitudes into paths of misery and vice, and thousands of blighted lives, to-day, offer up a dumb, pathetic protest against the civilization which savors so strongly of barbarism. It is needless to deny this truth, for relentless facts stare us in the face on every hand. In vain shall any seek to extenuate the matter—it admits of no extenuation. It is useless to plead ignorance, for where "knowledge is a duty, ignorance is a sin;" and so it becomes incumbent upon every intelligent man and woman to study into the cause and then apply the remedy to this evil. We are told that ignorance is the root of all evil. It is true.

It is equally true that to remove any evil, we must strike at its root and exterminate that. We find, on examination, that there is ignorance and ignorance, and that while the evil of one hundred years ago was ignorance of the head, the evil of to-day is ignorance of the hands; for "Satan finds some mischief still for idle hands to do." A system of education which develops merely the brain and admits the all-important training of the hands to some useful, self-supporting industry, is woefully defective; is, in short, of that kind against which we have been warned, as the "little learning which is a dangerous thing." It endangers individuals, homes and society.

A Harmful Theory.—There is a harmful theory, deeply implanted throughout the social world, which, having ignorance for its root, deserves extermination, and the sooner the better—a theory that "all men support all women," starting from the dangerous (because false) assumption that all girls will marry, and marry well, and that, there-

fore, the only education necessary for them is the acquirement of those accomplishments which will enable them to entertain well, dress fashionably, and conduct their household affairs tolerably well. The practical application of this time-honored theory proves disastrous, both to individuals and to society. False promises can not lead to true or safe conclusions. Many women never marry; many who do are deserted or divorced; many have incompetent or dissolute husbands, and many are left widows. Untrained to any industry, ignorant of the practical means of self-support, they drift aimlessly and miserably along, fearing the future, for which they are powerless to provide. What wonder that thousands are swept down into the whirlpool of destruction by the strong, resistless tide of circumstances!

How Our Girls Are Equipped.—How is our army of young girls armed and equipped for the battle of life? Forced to the front in a hand-to-hand conflict with fate, with no munitions of war, nor an hour's drill to prepare them for active service; with a smattering of many things, and a practical knowledge of none; pushed aside or "trod 'neath the hoofs of the swinish multitude;" forced to fight for their bread, and from lack of training in the higher, more renumerative, branches of industry, driven down into the drudgery of the lower, with its heavy work and poor pay, until talent, ambition and hope are dead, and they themselves are consigned to the grave of oblivion, or to even the worse and more pitiless fate of becoming the living monuments of their own irreclaimable loss and shame! No memorial days, no bands with dirge-like music, no flags at half-mast, nor floral offerings for them! There is nothing heroic about their martyrdom, and the world "passes by on the other side," with a feeling of wonder mingled with its contempt at their failure to fulfill the promise of their earlier years, "for they were bright girls at school, and graduated with honors." Find, if you can, a more cruel cavalry, on which innocence is crucified! Is not here a great and "unpardonable sin" of omission?

Controlling Circumstances.—If circumstances control men, so may men control circumstances, and while exists one slave to any circumstance which might be controlled and we neglect to do it, we are closely akin to him who cried, in days of old, "am I my brother's keeper?" If we cannot conquer single handed, we must unite our forces, and organize our effort until order is established with man as master, circumstance as slave. Much has been accomplished but more remains to be done.

Training Girls for Work.—During woman's long march through the narrow fields of a few industries, she became so proficient in them, that the world fell into the natural error, perhaps, of believing that she required no farther lessons nor review of them; that they were a sort of second nature to her. And so, when wider possibilities opened before her, the work of her hands dropped from her education, and the schools alone recognized her need of mental training, thus fitting her only for the professions, which, consequently, have become largely overcrowded, leaving hundreds idle who would otherwise be employed, while those who are naturally gifted for professional lives are underpaid, because of the excessive supply of cheap labor. This is wrong. Each child should be trained at school, to that work for which he is by nature adapted. One great secret of the numbers of idlers among our young, is that they have never been placed at their own work, but have been expected to do that which was designed

for another. Our greatest teacher tells us that there is a "diversity of gifts." A child that is hopelessly dull in one branch of study may be a genius in another. Caroline Herschel, though she could never learn the multiplication table, and always carried a copy for reference in case of need, became the accomplished co-worker of her brother in his world-renowned astronomical observations, and was, herself, the discoverer of eight comets. It should be the aim of all educators to first ascertain the particular work for which each child is gifted, and next to educate it in reference to that work, and train it to do it well. How much of misdirected effort, with its consequent failure, discouragement and loss, would thus be averted! "The labor we delight in, physics pain," sang the immortal bard. When each soul shall be free and fitted to follow the labor it delights in, what a golden age of accomplishment, and consequent happiness, will be inaugerated!

Training Schools.—Our government is now establishing industrial training schools among the Indians. That is well; one step leads to another, and may the good work go on until not a child of any nationality will be graduated from our schools without being armed and equipped with the practical knowledge necessary to win success! With all its children trained to the various trades, professions, arts and industries, our nation could no longer fail to recognize its need of opening new fields of industry. We should not, at this advanced stage of our prosperity as a nation, be longer compelled to import skilled labor, or export raw material in order that it may receive the form and finish which gives it market value.

Need of Skilled Labor.—The need of skilled labor in America is rapidly developing into a necessity as the demand for it increases. One writer states that the only cause of failure in co-operative laundries and bakeries which have been started in this country is from our dearth of skilled labor. More and more do thoughtful men and women perceive the deficiency in a system of education which does not bear more directly upon the practical needs of the vast majority of our people. Public education should surely meet the requirements of the public, and consult the greatest good to the greatest number. And there is a growing demand that industrial education be, in some way, engrafted into our public school system—a system which, though admirable in many respects so far as it goes, still involves a vast and needless expenditure of time and money by forcing all who are not to follow the professions to go abroad or enter apprenticeship in order to acquire the most useful and valuable part of their education, viz: The industrial skill necessary for their self-support; and it being impossible for thousands either go abroad or to find suitable apprenticeships, idleness is the result.

Women's Work at the Centennial.—One writer, in speaking of the Woman's department of our Centennial Exposition, says:

"Everywhere was a vast amount of pretty pettiness, which set forth in unmistakable language, how few and how small have been the methods by which women in the past, have gained a livelihood."

Yet there were signs of promise in many of their exhibits. From various schools of design, the students work gave abundant reason for foretelling a bright future for woman when she shall have wider opportunity. Fine specimens of art and skill were there. Admirable exhibits of *materia medica* gave proof of her ability to compound drugs. Exquisite carving

in wood, modelling in clay and in butter proved her artistic skill. Indeed, could woman's work have been gleaned from among that of her employers—and placed by itself in one department—a most interesting feature would have been added to the exposition. But, alas, small space would have been required for the work of our own country-women!

Technical Schools.—Why is this? Are the women of America less gifted, less intelligent or persevering, than are their sisters of the old world? No. In many respects they are superior, and blessed with greater advantages; but America has few schools of design, and fewer technical schools. In Europe both are numerous and excellent, teaching millions of girls and women who study science and art, as practically applied to the industries. This is the secret of their success: Their art schools are established by government, and supported by yearly appropriation. At the South Kensington museum, London, 100,000 students receive free instruction every year in the industrial and fine arts. There are more women than men students, and their success is said to be greater, as the fine work is so fitted to their more refined touch and delicate perception. In the United States no such national provision exists. The want is partly supplied by private benevolence and enterprise, but the vast majority of our students of the fine or industrial arts are forced to go abroad. Can we afford this? To what wiser use could a portion of our vast revenues be devoted than to the practical education of our children?

Manual Training.—The kindergarten method teaches the smallest ones how to use their hands and discriminate forms and colors, and the more difficult and useful manual training should be taught with the correspondingly advancing grades of mental development throughout the entire course of study, until, at the last year of school, the senior class should have gained such mastery over hand and brain as to accomplish separate and difficult feats with both simultaneously. This would give them power to continue study through life, and in a country where the poorest child may be elevated to the highest position is specially needed. It is a false idea that one must be locked in a room with ones books in order to acquire learning, and labor should not be so new and strange as to absorb one's entire thought and attention. Let us profit by such grand examples as that of the earnest student at his forge who used his brains on other problems than what his hands were forming, and of our hero who revolved in his brain the mighty problems of a nation while splitting rails! Elihu Burritt and Abraham Lincoln were marked exceptions of natural power of concentration of thought; but it can be acquired, and its value can never be over-estimated. Train the hands until they perform their tasks mechanically and accurately, not enslaving the mind. A good beginning to this training is the compulsory drawing in many of our schools. Also, a few schools of design have been established here, as well as art schools, cooking schools, schools of wood carving, pottery, sculpture, etc. Our industrial exposition was a great and valuable object lesson, and awakened in many minds a "divine discontent" with our present order of things, demonstrating that we are far behind the older nations in giving that finish to our work which so adds to its beauty and market value

The Economic Standpoint.—One of our New England manufacturers states that the designs used in his factories alone cost forty thousand dollars,

every cent of which goes to Europe; and he adds farther that the same designs might have been produced at a cost of less than five thousand dollars, within a mile of his mills, had an art school been maintained there for five years. The proverbial Yankee will disappoint the world, if he fails to catch the drift of that fact, and to make its practical application. But, after all, the economic is the lowest possible standpoint from which to urge this reform. One authority upon this subject says that, as suitable occupations are provided for girls and women, the worst evils which afflict society rapidly diminish. Surely then every mother and every father and philanthropist should labor to supply them.

Duty of Parents.—The old-time prejudices against women's entering the various fields of labor have melted away, one by one, till she now stands within the gates of nearly all. But it is for the masses we plead—for those who have not the strength, courage and ability to surmount the obstacles which still obstruct their way. It certainly is the duty as well as the privilege of parents to tenderly guard and cherish their little ones, and when they begin to walk to remove every danger from before them, and especially to see that they do not wander out into the streets alone.

Duty of the Nation.—As with the individual, so with the nation, and for America to neglect teaching its multitudes of children how to walk or even stand unsupported, while thousands of them must inevitably be forced out into the hurrying, dangerous "highways of life," alone—(or perchance with others even more helpless than themselves to care for)—is to "out-Herod Herod," in a wholesale "masssacre of the innocents." But it is sometimes objected: "If the State and nation provide the intellectual training, it is the duty of fathers and mothers to see that their children become self-supporting." Under the old custom when children were expected and compelled to follow the vocation of their father this was practical; but now the child may choose to learn that of which its parents are entirely ignorant, and they might not have the means to import teachers, or send pupils to Europe.

Face the Facts.—Many industries, which, in former days, were considered as belonging exclusively to woman, are now invaded by her brother, and she is obliged to meet with his powerful, and oft-times over-powerful competition. Laundry work, baking, weaving, spining, knitting, butter and cheese making, even millinery and dress making—nearly all occupations that are on a large and paying scale are conducted by men. Not that we complain of this—far from it; but we must face the facts, and adjust ourselves to these new conditions, and see to it that they do not result in that direct evil, enforced idleness to any class. Let other industries be established, with schools of training which shall enable our children to labor in them successfully! Intelligent work drives out drudgery; breaks the chains and sets free the slaves of circumstances, leaving time and strength for other things besides the desperate, unremitting struggle for a bare existence. And the reasonable exercise of all our faculties, mental and spiritual, as well as physical, is essential for their proper and symmetrical development. Says one authority:

"Nervous diseases of every kind are often caused by too close confinement to a most narrow circle of thought and duty, and here is the explanation of the large proportion of farmers wives in our insane asylums."

Schools to Teach House-keeping.—This brings us to the special need for establishing schools of training in the domestic industries, and for providing all the agitation and light necessary to hasten the evolution of the several distinct spheres of labor now involved in chaos which fills and over-shadows our kitchens. The girl of the period is educated beyond not the work itself, but clumsy methods of doing it are taught, or the barbarous ideas of carrying on four or five separate trades at once; and when she drifts into the farm house as mistress of its present conglomerate house-keeping, she is at once submerged in a chaos which is, indeed, "without form, and void" of light, being filled with the darkness of despair to her unaccustomed vision. Where now shall she look for help? The "other girls" argue, as she herself has lately done, that in the fewer hours, better pay and social privileges of other employments, are more time, means and opportunity for rest and recreation; and their reasoning is full of the unanswerable logic of truth. For, despite the elegant arguments in favor of quiet home-life, healthfulness of country living, with its pure air and water, abundance of milk, fresh vegetables and fruits (all true), still there is a grim skeleton in the closet, which "will not down" nor out, but which drives the girls out of our kitchens into other fields of employment. While other classes of work have their regular hours, the hired girls work is variegated as is that of her mistress, and, like hers, is never done, and instead of having fixed rules, depends too often upon the caprice of her employers or their children.

Social Ostracism.—Socially she is ostracized—a shame, but a fact. The State has much to do with the social ostracism of any class of laborers. So long as any government legalizes moral impurity and sin, and attaches manual training to its penal institutions alone, it degrades labor, and places a premium on vice. Labor is honorable, and should be elevated, not degraded. Vice is dishonorable and should not be made respectable by laws which justify the wicked for reward of license. Even though society blindly cherish that relic of barbarism, the false and pernicious idea that to be a lady one must shun certain classes of honest, useful work, we have a right to expect better statesmanship from the few who are chosen and trusted to legislate for the many. The girl who in a factory, a store, a bakery, or in any other systemized and respectable work, would be called first class help, rebels here at once, and leaves our kitchens to go, perhaps, to the city, too often to follow a life of gilded misery. Or, perhaps, the girl is wholly incompetent, her industrial education having been left entirely to her mother, and that mother a foreigner with little or no idea of American methods of housework; probably spending much of her time and strength in field labor, therefore accustomed to slide through her indoors work with all possible dispatch. With this class of help the unfortunate mistress is reduced to a choice of two evils, and, choosing the least, sends the girl home, much as she needs help, preferring to do her work alone. We all have seen domestics who needed reorganizing. The same is true, alas, of mistresses. But the education and the work itself need it most and first. After that has been accomplished, other difficulties will settle themselves.

Necessity of Manual Training.—Every intelligent woman who is mistress of a home sees the necessity of manual training in the various and diverse departments of labor which surround her, both for herself and for the

help she so needs, but which, under existing circumstances, it is so often impossible to secure. And so it is that our army of sweet girl graduates who enter this battle field of labor are at once forced into active service with little or no training or re-enforcements. Amid the dust and smoke of battle, in their war against dirt and disorder, they must also attend to the culinary department, in itself a varied and extended industry, including several separate and distinct branches of labor; to the making and mending of garments; to the laundering, dairying, fruit-picking, canning, preserving and pickling; to the setting and clearing away of tables; the washing, wiping and putting away of dishes, three times a day, for 365 days in the year, and one additional day for every fourth year. And more than all, there come the work, the care, the ceaseless anxiety and responsibility of raising her family of children.

Strength and Brains Needed.—Roasting in the kitchen, chilled in the ice-house or cellar, needed in the nursery, the poor, distracted, despairing mother needs a leviathan for strength, and a Napoleon for brains, to conduct her warfare amid this labyrinth of difficulty and danger.

As the girls with brains are rapidly deserting our kitchen ranks, we must capture our leviathan in the iron harness of steam-propelled machinery, with a few trained keepers to superintend his labors; and the Napoleon who shall lead our despondent army safely through these, narrow, steep and dangerous defiles onward and upward to victory is industrial education, with its more civilized method of warfare—organized co-operation.

TO IMPROVE OUR COUNTRY SOCIAL LIFE.

By Mrs. J. A. CLARK, Jefferson County, Wis.

Third Paper.

Farmers in Town.—I read, not long since, in a Chicago paper, a complaint that social life among the farmers was dying out; and one of the reasons given was that so many of our well-to-do farmers are in the habit, when they have things fixed comfortably and to suit them on the farms, of letting them, and moving to far less pleasant quarters in town. In fact, in every village you can see something like a half dozen men, gentlemen farmers I suppose one should call them, men who own broad acres and homes having every comfort, who have let them to tenants, and now live in some small house, on a back street, industriously doing nothing, and who propose to spend the remainder of their lives in this cheerful occupation.

Country vs. City Life.—I am not blaming these men; they know what they want, and are able to have it. But it seems to me there is something wrong about our social system, to cause such a

state of affairs. In other and longer-settled countries than this, life on a farm is considered by far more enjoyable than life in a town. For centuries it has been the ambition of nearly every city-bred Englishman to own some estate in the country, where he could put his foot on his own ground, and enjoy pure country air and existence free from the tumult, din and smoke of city life. From the time of Virgil and Horace to our own Longfellow and Whittier, all poets have sung the joys of country life.

"A little farm, well tilled," writes one. Says another:

"Happy the man whose wish and care,
A few paternal acres bound,
Content to breathe his native air
In his own ground."

Men like Webster and Clay, like Jefferson and Washington, delighted in their country homes and spent all their available time there, and physicians all agree that the prospect for health and long life is much more favorable in the country than in the city. Since men so eminent and intelligent unite in considering the country so desirable an abiding place, we should earnestly seek the reason why so many people leave it, for if the best people do leave the business and settle in town, it must necessarily follow—the best going and the poorest staying—that the race of farmers will deteriorate and become an inferior people. The reasoning of Darwin and Herbert Spencer proves this, but we have not come to this yet, and I hope we shall not.

Why Farmers Leave the Farm.—The reason these people do leave the farm is doubtless because of the want of social advantages to be found in the country, which they hope to find in the town, and which they undoubtedly do find to a greater extent.

The Happiest Man.—I will mention two ways in which one family have occasionally relieved the tedium that does at times envelop a farmer's existence, saying first, however, that I do not agree with a remark which I read of Senator Ingal, where he says "that the happiest man he knows of, is the farmer who has no acquaintances farther away than eight miles from his home," meaning that a farmer's business and friends and life should be centered in his own township. It seems to me that this idea of happiness is as correct as to say that the happiest thing in existence is a fat hog in a pen. There can be no doubt that he is happy, but it is not the kind of happiness we look forward to, especially in a land like ours. This is a beautiful State, embracing a great variety of scenery, with its lovely lakes, its fine forests, its rolling prairies, its rushing rivers, its ridges covered with woods, its valleys waving with grain. In such a country to limit a man to eight miles is to deprive him of much of the best that God has given free.

A Pleasant Ride.—When my husband and I were younger than we are now, it was our custom—after our spring crops were in—each year to take a little ride. People emigrated a good deal in those days, and we used rather to envy them as they went by in their canvass covered wagons. So we rigged a white top on a light wagon, and started out to see the State. We camped, cooked and ate our meals by the roadside, slept in our wagon, and our expenses were trifling. We drove about forty miles a day, and though I expect people wondered to see an emigrant wagon scooting along at a good trot, and also at the various directions we sometimes took, yet we were always used well, and not only obtained a practical knowledge of the geography of our surrounding counties, but in several instances increased the circle of our friends,

and after a week's journey came home satisfied that providence had fixed our dwelling in such glorious surroundings.

Wedding Trips.—If any of our young people are contemplating a wedding trip before settling on a farm, I would suggest that they may combine economy (which all young people should take into account) and fun in the novel nature of the conveyance, and seclusion, which newly married people always desire, and instruction in the geography of their immediate neighborhood, in such a journey, to a far greater extent than in the more expensive arrangements that are usually made. If they start about the 1st of June, which is an excellent time, they also will be able, every few miles on their road, to get a realizing sense of the practicability, the excellencies, and the great and glorious common sense in every way displayed in our Wisconsin systems of road-making and repairing. This would make a nice wedding journey, and as each year went by they might repeat it; only perhaps on the next trip they might feel like taking a few friends with them. Do you have any doubt that a party of young farmers and their wives would have a good time on such a journey?

By-and-bye there would be children to take along. I well remember when our wagon-seat made a good spring bed for our boy, and his delight when, in one of our rambles, he caught his first brook trout.

Fishing Excursions.—As our young friends grow older, and perhaps tire of long rides, shorter distances and longer stops could be arranged. This State is full of lovely sheets of water, well filled with fish. Parties think it worth while to come to these lakes from Milwaukee, Chicago and St. Louis, to pay their fare and put themselves to much expense for a few days outing in such charming situations. Why is it that intelligent farmers living within easy distance, with plenty of transportation at comparatively no expense, do not avail themselves of such privilege? Have they worked so hard as to blunt their sense of enjoyment? This is what I fear of our farmers, and it is a danger that should be attended to. Let them try this next season. After the corn is planted, I believe any fairly well-to-do farmer can manage his affairs, so as to be gone a week. Let him arrange a small party, not of his immediate neighbors, if he can do otherwise (he sees enough of them at home) but of those of his acquaintances who are farthest away who are congenial to him. Thus he not only enlarges the number of his friends, but the further advantage in that seeing them seldom, he only sees their good qualities and does not discover their bad ones. Let them take teams and tents and go at least a day's drive from home, to secure a good fishing place, and camp, and fish, and spend one week in a total change of conditions from the usual surroundings, and if they are good fellows—and nobody else ought to go into camp—and their wives are pleasant companions, they will come back rested and refreshed for all the rest of the year, and will look forward with interest and pleasurable anticipations to its renewal the next season.

One not only sees but learns much in such a trip. I remember once asking the road, and a man told us to go to the corner where the school-house stood before it was moved, then turn to the left and go through the woods till within a half mile of old man Jones, then go down to the town line, and pretty soon we would strike the county road and that would take us where we wanted to go. It is needless to say we got there. How many of my readers know and have seen Oil City in this State? Yet it is not only on

the map, but a splendid artesian well throwing a 4-inch stream twenty feet high, and one house mark the spot where one patriotic citizen tried to make this state the equal of Pennsylvania.

Not Good to Vegetate.—I have suggested these trips as a way that farmers might profitably and pleasantly spend a week in the summer. We are told that a rolling stone gathers no moss, and my idea is to roll a little moss off some of our farmers; perhaps there are too many moss-backs among them. Most sorts of vegetation are good on the farm, but it is not good for the farmer himself to vegetate; yet there is a tendency that way, and I think it would not be difficult for any one hearing me to bring to mind some farmers, or perhaps some whole family of farmers, who do not live more of a life than their own cattle, if as much.

Saving and Hoarding.—Within my own neighborhood an old man and his wife have lately died. They were childless; they had no near relatives nor any friends to care for; yet all their life was spent in saving and hoarding. They neither had good food nor good clothes; they lived in the worst room of a mean house; although the man was fond of reading, he took no paper; they had no enjoyment except what they derived from knowing they had money, and the constant fear of losing that offset that pleasure.

When they died, they left 80,000, all they had; they didn't take a cent with them, and now three sets of lawyers are dividing it up among themselves. This case reminds me of a man who, when he was a boy, found a piece of money in the road. This gave a turn to his life; ever after he walked with his eyes on the ground, seeking to find other pieces, and while he did at times pick up small sums, yet the beauties of nature—the the sun, sky, the procession of the stars, the clouds, the various colors of the woods and fields were unknown to him. He gained a little money; he lost everything that life is worth living for. It is not the man who has the most acres, nor even he who raises the largest crops that is the most successful farmer; but rather he who, with an active and intelligent mind, a happy and cheerful heart, an industrious and prudent disposition so averages his work and his life, that his labor, and the rewards of his labor, give him means for instruction, recreation and amusement; and these in turn so refresh him that he returns with pleasure to his work. His is a well-balanced life. All work and no play, makes any one dull, and it is *more amusement* that a farmer needs. He rarely, if ever, suffers for work. We need not urge him to work, nor need we hunt up work for him; but if we can suggest anything in the way of fun, we are doing him a good service, and if I can show any way that can add to a farmer's enjoyment, I am willing that others should teach him how to add to his crops.

Winter Amusements.—I have given you my idea of what might be done in summer. I will now offer a suggestion as to how we might improve on social life in the winter. I premise that at this season farmers have plenty of leasure. Our winters lately strike me as being about nine months long, and but few farmers are pressed with work at this time of the year. Granted the leisure, granted intelligent and well-to-do farmers, how can they spend part of their time intellectually, pleasantly and socially? Some one will probably say with a reading club, with a debating society and with the grange. Well these are all right if you can get them to do it. But I never knew a farmer to join a reading club. They prefer to sit by their own

fire and read. A debating society runs into tariff and politics, and amuses the ladies but very little. I belong to the grange and enjoy it, particularly the social features of it, and think these might be enlarged to advantage.

Whist Clubs.—But the particular plan which I would suggest would be for intelligent farmers and their wives in any neighborhood to form a whist club. Whist is emphatically a farmer's game. Dependent not upon surprises, it requires of its players a clear, solid intellect, a good memory, quick and accurate observation, a patient attention and ready reasoning powers. It is not only a recreation, but it is a discipline. As an intellectual exercise, it is as powerful and potent to strengthen the mind and exercise the wits as are algebra and geometry, and far more pleasant to take. If a man can by his reasoning learn that it is for his interest in the game to lead up from his long suit rather than from his short one, he is making the same kind of discovery that leads him to make a four years rotation of his crop in preference to the short-sighted, though sometimes for the moment profitable plan, of following wheat or barley with the same crop. In either case he looks and reasons ahead of his immediate surroundings.

Whist Quickens Wit.—We frequently see it stated that while the farmers of Wisconsin are naturally the most intellectual people we have, they do not sufficiently exercise their faculties, and have need to learn to use their brains, and I think whist—a purely intellectual game—would give them this opportunity. It would also make them quicker-witted. We hear farmers say when they have been swindled by the Bohemian oats man, or the lightning rod sharper, or by some other scamp that preys on them, that if they had taken time to think the matter over they never would have done so, the fact being that the farmer, having so much more time than other people for intellectual operations, has given himself a larger allowance of it than the business men do, so that when there comes a sudden call for a quick decision he very frequently arrives at a wrong conclusion, much to his detriment. Now, had these farmers been whist-players—had they, in the various contingencies of the game, been in the habit of being called on for immediate decision in regard to their course of action, they would have acquired a quickness of apprehension, and a readiness of intellect that would have been of profit to them in the emergencies above mentioned. There is a continued call in farmers' lives for greater intellectual activity, and the discipline of whist would supply it.

Recreation for Farmers' Wives.—I read in the last agricultural report that a farmer was never known to get along unless his wife knew something. I mention this here, but what I have said as to whist should not lead the men to go off by themselves and have a game together, for, in my opinion, women are fully entitled to their share of any fun. I waive the question as to whether a man or his wife does the most or the pleasantest work, but under any circumstances the most amusement falls to the man. It is he who goes to town. He can loaf around stores and post office, he can attend elections, and his business relations give some variety to his existence, while for his wife there is simply the treadmill of her daily duties. We continually hear that farmers and farmers wives should read and improve their minds. Perhaps they ought, but one thing a farmer's wife needs. A woman shut up all day with an enless and unvarying round of labor—whose whole life is a narrow routine the

limit of whose horizon is the back kitchen yard, and the extent of whose travels is the wood pile and the well—this woman I say needs recreation and amusement, and any plan of a farmers' whist-club that does not take her in as an equal partner is defective from its foundation. So here we have the material for our club. Two families can comprise it, though the more there are the better, and the more sociable the management. Of course they meet alternately in one or the other's house, and even if several families belong it is not necessary for more than two to get together at once; this, probably, is the better way, thus giving more opportunities for meetings.

There should always be some refreshment. Farmers who raise so much are the last people in the world who ought to go hungry. For the oysters are always good, and fried oysters are better than stewed, but they are comparatively expensive, and I believe that, as a rule, it is best to provide things as much as possible out of our own produce and above all things would mention against a too extravagant lay-out. We had at one place a little whist club, that was broken up I think because each lady felt it necessary to her reputation to go a little ahead of the one before. So that one little lunch ended in an extravagant spread and exhausted all our resources. Bread and butter and cold chicken, a turkey, or, if one knows how to make it, chicken salad (I do not think salads are quite as well known as they ought to be among our farmers), a cold tongue, broiled ham, spare-rib or corn beef neatly sliced (only one kind of meat at a time, of course), with coffee or cider, would make a perfectly satisfactory sort of a lunch for any kind of a farmer, as it would be a pretty poor farm-house where these things could not easily be set out, and a farmer always has one great advantage that occasionally fails a city man—he has a good appetite. I would allow one, and only one, kind of plain cake, and some sauce or jelley for a finish.

Work and Expense.—There is but litttle work in such a repast, and but little expense. A very nice wine jelly can be made by using Cox patent gelatine, at a cost of but little over 10 cents a quart, of course using home-made wine and not counting that in the price. Currant wine gives a better flavor to sauces and jellies than any you can buy.

Books on Whist.—Now if I have persuaded any one that he wants to play whist, let me say something as to the game. The St. Paul Railroad last year issued a little book for beginners which I am pleased to say was written by a lady, and distributed free by the passenger department of the road. This book gives one some idea of the fundamental principles and value of modern whist, and if one should obtain it and study them, it might have a tendency to lessen in some degree our feeling of hostility toward a corporation which charges about as much for carrying a bushel of grain from Madison, as it does from St. Paul.

When the book is mastered, if the beginner wishes to learn the fuller development of the game, and the finer touches of scientific whist, I would refer him to the works of such authorities as Cavendish, Pole or Proctor, all of which are excellent, and there is no reason in the world why farmers should not master them.

Time Not Wasted on Whist.—We see in the papers accounts of the whist clubs of Milwaukee, Oshkosh, Chicago and other places. The members of these clubs are among the best and most prosperous people in these cities. They consider it neither frivolous or weak or waste-

ful to devote one evening to this recreation. We have the same chance at this game in the country that they do. We often hear comparisons drawn between the advantages of city and country life, and while I admit their superiority in many things—in schools, theatres and lectures—I believe we in the country have our compensations, and for certain classes even overbalancing city advantages. I am sure that farmers owning from one to two hundred acres of land, and worth from five to ten thousand dollars, are better situated to enjoy life, and do lead a freer and happier existence; that they have more comfortable homes and grounds, less anxieties, better health and purer and pleasanter natural surroundings than their city brothers.

Amusements for Children.—Our children, however, complain of the lack of amusement on the farm, and they have cause for complaint to a certain extent. When they go to the city they see their friends going to theatres, concerts and lectures, amusements unknown in the country, and they do not offset the advantages country life also has. I think the city boy who spends a week in the country hunting and fishing or loafing, enjoys himself fully as much as the country boy does in the city, but I claim that we might have more enjoyment than we do, and I have suggested whist as one equally practical in either place, and one which in a family of two, three or four children, is excellently adapted to restrain that restlessness which drives so many boys from home.

A Pathetic Sight.—It is at times almost pathetic to see the endeavors farmers make for a little enjoyment. They will all turn out for a circus. My little village usually celebrates the Fourth of July; from miles around farmers and farmers' children come to town and stand around all day in the hot sun, as they think, enjoying themselves. I know plenty of people to whom funerals seem to be about the happiest and almost the only event of their lives. To all these persons, if they have the intellect to comprehend the game, and I believe they have, whist would be a boon and a blessing.

Objections to Cards.—I will close with a word on one point of view on this subject. There are some people who object to games of cards, and while they will allow games of authors, and places, and such, they have a holy horror of cards with spots on them. To these I would quote Charles Wesley. When fault was found with him for setting his hymns to the music of worldly songs, he said he did not propose to let the devil have all the good times. So I would say, whist is a good game—a strong and intellectual, and a beneficial game to know.

Do not give satan the advantage of having the monopoly of such a game. Let him have the games of authors and proverbs, and all such foolish and trifling sports, if you will but reserve this good game for good men. "Bread and the circus," was the old Roman cry. The farmers and farmers' wives have lots of bread. Give us a little more of the circus.

sociation of Wool Manufacturers, a very intelligent body of men comprising a large part of the leading wool manufacturers at the East, are on record repeatedly, as saying that the great bulk of the clothing wool grown in this country is the best for the purposes for which it is used, anywhere produced, and cannot be duplicated from any part of the world. That they use other wool, is not denied; that they mix an inferior article with the more valuable home grown, is admitted. But the fact remains, that 150,000,000 pounds of wool of raw material are now wanted to supply our own home demand for manufactures of wool. We have soil and climate adapted to supplying it, and of a superior quality. Is the amount of money it represents, a sum growing larger year by year, to slip through our fingers without a big effort to retain it?

Competition Fierce.—Competition, the world over, in all the channels of trade and commerce, is continually growing more fierce. The Danes have captured our foreign butter market, and our whilom export of 100,000,000 pounds annually has dwindled to the merest pittance. Our foreign cheese market has gone to our neighbors, the Canadians, and our prospects for recovering our market abroad for either, are far from reassuring. A Danish representative has been in our State this winter, sizing up our dairy interest, and measuring its probable increase and the amount of intelligence put into the business, that they may be forwarned.

Continental Europe, including even little Denmark, excludes American pork from its markets on the most frivolous pretexts. Are we to lose our foreign market for these things, and others, of which we have an ever growing surplus, and at the same time buy of others a product of vast importance to us, that we can raise a better quality of at home than they can send us? Such a course would be very poor economy, to say the least.

I believe still, that wool-growing is to have a prosperous future in this country. I base my belief on the absolute needs of our people, the better quality of the material produced at home to meet these wants, and economical considerations of national importance.

Methods of Production. — Some changes in methods of production are demanded, and will undoubtedly take place —such changes as will look to diminishing the cost of producing wool, by improved methods of breeding and feeding, and the production of mutton therewith. Something has been done in this direction already. The flock-master to-day who shears an eight pound average from his flock—and a good many are doing it —at thirty cents per pound, gets as much and even more, for his aggregate product, than formerly when selling a six pound average at three shillings per pound; and at that figure, we were all very well satisfied, and would have kept on in the business. That the production of wool, as a first consideration, though not here advocated, may, by attention to the details of breeding, feeding and handling, be cheapened to quite a per cent. below former cost of production is a thing hardly to be doubted.

Flock-masters Discouraged.—For four years flock-masters have been discouraged, and have failed to summon to their aid investigation and experiment. I do not think I underestimate the difficulties in the way of profitable wool growing. A new departure is inevitable, unless we are ready to ignominiously surrender. We are about in the same fix as the old German farmer, of whom the story is told, that he left his own cattle on the shortest kind of rations of dry fod-

der, to look over a neighbor's cattle, luxuriating in plenty, on the contents of a silo. After regarding them steadily for a while, he was asked if he thought he would build a silo. His sententious but expressive reply was:—"I've got to." We have got to produce wool cheaper.

Characteristics of Breeds Changed.—A hundred years ago, or more, a breed of cattle was established in England, destined to exert a mighty influence upon the stock-growing interests of the whole world. As perfected by the far-seeing breeders of those days, this magnificent breed was equally valuable for yielding milk and butter for the table, and delicious roasts to tickle the palate of the epicure. Years rolled on. They were brought to our own country. Fashion changed the aim of American breeders, and breeding for the show ring and for beef alone changed the characteristics of this noble breed to such an extent that its value to the general farmer (always constituting a large share of the people) has been greatly diminished; and breeders find themselves confronted to-day with the necessity of retracing their steps and entering again from, or recurring to, the former type, if they would maintain the supremacy of their breed.

Our Spanish-Merinoes.—The case with our breeders of Spanish-Merinoes is not entirely parallel, but is in a great degree. The wonderful development of the animal has been just such a one-sided affair. It has looked only to development or improvement of the fleece. Other considerations have been lost sight of. Constitution, size and form have been too much neglected. It would be a curious incident in the history of fine wool production if the present depression in the price of wool resulted in such a change in breeding as would give to the Merinoes greatly enhanced value as a mutton breed. Such a thing is not impossible, hardly improbable. In fact, there are said to be flocks of pure-bred Spanish-Merinoes in Western Pennsylvania and West Virginia averaging much larger sheep than ours, without the excessive folding on the body, and wool of excellent quality, but not so heavy with yolk. They are said to be much sought after to breed up flocks of the ordinary type of Merinoes. Spanish-Merinoes of a not dissimilar type are found in limited number in our own State, and, with their development, a new era in the history of fine wool sheep husbandry, seems entirely within the range of possibilities.

Competition Defied.—With an animal so bred to the requisite standard, or degree of prepotency, the American wool-grower could defy competition, come whence it might. I find in different parts of the State a good many men disposed to stick to their flock of Merinoes. They say they like the business, make a good living at it easily, and will not yet give it up. Others say they will try to change the type of their sheep something in the way I have indicated, or will cross with some of the Downs or long wools, having a belief in their capacity for mature mutton, at least.

For myself, I have little doubt these men will be successful in the end, in their experiment. They all claim, and not without some foundation in truth for their claims, that sheep husbandry, intelligently carried on, and all things considered, compares favorably with other branches of farming. But it necessitates the abandoment of the small pony-built carcass excessively folded, and a fleece of dense, but short and greasy wool. It precludes the idea of breeding exclusively a class of sheep that will make a record like the following, taken from the statistics of the

State sheep shearing, held at Whitewater in April, 1881:

Fleece	*Weight of Carcass.*	*Per cent of Wool to Carcass.*
No. 1—12 lbs. 4 oz....	4¼ lbs.....	.....1 to 3 3-5 lbs.
No. 2—10lbs. 11½ oz..	4⅕ lbs.....	.....1 to 3 3-10 lbs.
No. 3—14lbs. 15 oz...	5⅔ lbs.....	.....1 to 3 ¼ lbs.

Form and Vigor Diminished.—Is it to be wondered at that persistent effort, to develop a tendency in breeding to produce only a heavy fleece, should have impoverished form, and diminished vigor of offspring? Can anyone give good and substantial reasons, why the ideal Spanish-Merino should not be at least 50 per cent. heavier than now seen; and though shorn of its excessive folds and yolk, still retain, its characteristics of fleece which now make it so valuable in manufactures? May not even an increase of product in wool on a scoured basis, be reasonably looked for with increase in weight of carcass? A solution of these questions may be looked for in the near future, if not from choice, most assuredly from necessity.

Demand for Mutton.—It is undeniable that the increased interest in sheep husbandry, at this time, is due to a demand for mutton, unparalleled in some lines in the history of the country, so far as I know. Not only is mature mutton bringing a high price, but lambs are wanted at prices decidedly remunerative to the grower. A city daily of this week says: "Lambs weighing from 18 to 25 lbs., are quotable from $2.50 to $4.00, and even higher if they could be had—mutton, scarce and firm at from 7 to 8 cents."

There is no good reason why the production of palatable mutton as an important part of our farm industry, should not be quite generally adopted. Neither Australia, South America, nor our Southwestern ranches, with their present systems of sheep farming, can be depended upon to produce mutton of the best quality. Their flocks are too large and too much subjected to the vicisitudes of climactic conditions; with us, it is conceded that a pound of mutton can be made cheaper than a pound of beef, with the farther advantage of the wool.

Downs and Long Wools.—There are scattered about the State a number of breeders of Downs and long wools who are having a genuine boom in their business. I am more than glad of their good fortune. It has been some time coming, but the indications are, that the mutton breeds are to have a much larger share of attention in the future. There is room for all, and all are needed and have their excellent qualities. A general public demand for good mutton once established is not likely to soon subside.

The pure bred animals of these breeds are now too valuable, and too much sought after for breeding purposes, to be as yet available in directly increasing the supply of mutton; so that the demand for it must be met of necessity in great measure from good cross-bred flocks.

Does Sheep Farming Pay?—It will not do to say that sheep farming does not pay; for not a few instances might be given, and probably some will be to-day, of large profits to different individuals engaged in it.

Don't Abandon Sheep Raising.—I have endeavored in these disconnected remarks to lead you, and through you, the men engaged in the various lines of sheep farming in our State, into rather a new channel of thought, to a more comprehensive view of the business; rather than to try to tell what, after all, might not, and probably would not, be new to you. I cannot help feeling a keen interest in the welfare of sheep breeders and wool-growers, and

should regard it as a public calamity were they obliged to farther abandon their business. I do not hesitate to go on record as saying, to those who have farms adapted to the business, and who like it, and have the experience quite likely to accompany such conditions, don't abandon the business, expecting to easily find a more remunerative one, or one that always returns larger profits; and in closing let me say this: Don't fail to put into the business all the intelligence and skill, in feeding breeding and handling, the times demand, and without which you cannot reasonably expect to succeed.

EXPERIENCE IN SHEEP-RAISING.

By W. L. AMES, Dane County, Wis.

Second Paper.

Early Ancestry.—For twenty years past, I have had liberal opportunities for observation in the sheep line, and memory quite vividly accompanies me considerably farther back; yet not sufficiently far to recall any feature of the transaction whereby, for and in consideration of the sum of six dollars, my worthy ancestor became the possessor of four superlatively native ewes, averaging a fleece of less than two pounds, and with a weight of carcass correspondingly heavy. Such was the original and pioneer ancestry on the mother side of not only our present average yearly flock of 500 sheep, but of many hundreds disposed of on a mutton market.

Suggestions to Sheep-Breeders.—For several years past it has been my pleasure to be a sharer in not only the gains, but the losses connected with the handling and rearing of sheep. We lay no claims to fancy breeding, but breed and handle only our own product, and that only as any practical farmer may whose taste lies in that direction, who can appreciate their advantages in connection with good farming, and lastly, who can forego the pleasures of spending his time lounging on dry goods boxes and counters, and loafing on the streets of the nearest village, when he should be at home attending to his animals, which, in return for favors rendered him, are also dependent on him for a certain amount of care and attention—and generally to just about that extent that he cares for and attends to them, will they prove remunerative to him. Let him, who cannot this much deny himself, leave sheep husbandry to some one else.

Objects and Gains.—Our mode of management has been so odd in comparison with that of the majority of farmers, in so persistently and continuously clinging to sheep as a factor in our farming, that we may almost be considered eccentrics in that line, and these questions may very naturally arise: What have been your objects, and what your gains?

In answer to the first, I would say that we desired to improve on what was at our hand, and that there was room for improvement on such a quartette of

sheep as I have described, none can dispute. We also, at an early day, observed an economic relation existing between shepherding and grain raising.

Second, as to our gains, I consider that we have built up, out of this meager percentage on the one side, and improved males on the other, a flock of sheep worthy of fair consideration, and at the same time, have built up, out of sadly impoverished lands, a farm of nearly 400 acres, whose fertility and producing qualities, to-day, I believe, are second to not many, in this the hub county of Wisconsin.

Size, Wool and Numbers.—Our experience in breeding has thus far been entirely in the direction of fine wool sheep, and with three objects kept persistently in view, namely, size, wool and numbers.

As to size: From the diminutive maternal ancestry before mentioned, coupled with improved males, breeding only from mature animals, and by careful and considerate general management, we have secured a size in fine wool sheep that is most gratifying to us, and quite a source of comment from observers.

For several years past, our yearly mutton flock has numbered about 120, averaging at time of sale from 110 to 118 pounds. Of the three sires of our last three crops of lambs, we sold two not long since, one weighing 175, and the other 195 pounds, retaining for farther use the third, which weighs nearly 200 pounds.

In the wool line, the ideal toward which we earnestly labor is a long, fine, wooly wool, and a bulky, fleecy fleece, instead of a soggy lump, at the same time as weighty a fleece as possible without detriment to the above mentioned important properties. Of the three above mentioned sires, at our last shearing, two sheared 23 pounds each, and one 24. Our entire flock of about 400, averaged 9 pounds. The heaviest, though by no means the best fleece that we ever produced and sheared, weighed 29½ pounds.

As to numbers: We desire to carry as many sheep as will properly utilize such a proportion of the farm for pasture during the pasturing season that they may make the rounds of the farm ordinarily about once in five years. And farther, as one of our prime objects in continuance in sheep husbandry is for their renovating properties on exhausted lands, numbers with us have been an important consideration, and as no other breeds will compare with the fine wools for keeping in large flocks, that has been one of our reasons for so persistently clinging to that type of sheep.

How to Secure a Good Clip.—To produce and secure a clip of wool in good condition, requires much and untiring care. To prevent the accumulation of foreign substances in wool, certain requirements are almost absolute. Never feed under the grain measure or the fork; place the feed and then let the sheep to it. Never give them access to hay or straw stacks. Secure to them a dry place to lie so that the under parts of the sheep shall shear as freely as the sides. Avoid exposure to bleaching storms as much as possible when the wool is nearly grown, and to have a fibre of uniform strength requires uniformity of care, rations and general conditions.

Then if, for a clip of wool produced under the above mentioned conditions, we could secure a price based upon its real comparative merits with other competitive clips, instead of assigning to it an almost absolute and unconditional value, based upon an imaginary commodity called "washed wool," there would still be some satisfaction in producing a clip of good wool.

Washed and Unwashed Wool.—To illustrate the existing inconsistency, let me narrate a brief experience that has come to us within two years past: Two buyers called, examined our wool, and from their own thorough and personal examination considered it washed wool, although water had not touched it for at least two months previous to shearing, to say nothing about washing. They were unceasing in their compliments to the wool—how clean it was, etc.; but they found it a rather heavier grade than they wanted, and presented arguments to convince me that 8 pounds was heavy for washed wool, an argument that I had no grounds for disputing.

But I pressed them for an offer, which they finally made, 25 cents per pound. Before undeceiving them, I loudly denounced the unjust absolute discrimination between so-called washed and unwashed wool, to every word of which they assented, as did the school board in one of Carleton's poems—"them's my sentiments, too." After disclosing to them the fact that the wool had never been washed, they could give but 17 cts., but were in too great haste to make the next point, to stop to close a bargain.

Economy in Sheep Husbandry.—Our experience indicates to us that there is an economy in sheep husbandry worthy of careful consideration. There is still a class of farmers among us who make no pretentions to raising and selling anything from their farms except grain. And what is the tendency of such farms. So evident that a blind man can preceive it. Some such have already run their course and portions, at least, been abandoned. In contemplating, I am almost led to explain: Oh, destructive man, review some of thy works, and blush!

I believe I have not misrepresented, for we have had to do with at least two parcels of above described lands, portions of each of which had been abandoned to weeds, and although naturally of the best of soils, had become so attenuated in grain raising that they had *all but failed* to bring forth. We bought, seeded, and devoted to sheep pasturage for five years, and behold a magical change! At that time a portion was hesitatingly disturbed and cropped, and produced most bountifully, although it was the first of the last two dry seasons. What did our sheep do for us in all this? Well, we bought cheap lands, but through the agency of our sheep, we harvested from those lands each year a bountiful crop of mutton and wool, without teams, plows and harrows to cultivate, or expensive binders to harvest, returned almost element for element to the soil again, and in the meantime almost doubled the value of the land. Not a bad account for the sheep column.

Adaptation to the Business.—It is frequently remarked to us: "You seem to be more than ordinarily adapted to keeping sheep." Not so. While to any man who says within himself, "somehow, I don't like sheep," I would say leave the handling of them to someone else then, yet there are many farms near us at the present time, on which sheep would pay better than they will on ours. The more impoverished the land, the more evident their renovating properties. Of late, our sheep remain out continuously during the grass season without disturbance from dogs or wolves. For relief from the latter try "scare crows."

Sheep and Weeds.—Nothing has as yet equalled sheep in clearing land of foul plants, such as burdocks, pitch fork, etc. We were once the happy possessors of a patch of Canada thistles which defied all efforts at extermination until

we were able to bring our sheep to bear on them, when, with a mixture of sheep and salt, they yielded at once.

Value of Sheep to Land.—A neighbor not long since proposed to us to rent some land that he was interested in, and put our sheep on it. During the conversation mention was made of renumeration at the rate of 3 dollars per acre. I did not question him closely, but suppose he meant to pay us that amount for the use of our sheep on each acre occupied. But we were loth to let them go at that price as we have some use for them yet ourselves.

Ticks and Contagious Diseases.—To ticks we are strangers, not one having appeared on our flock for many years. Fair keeping, handling only our own product, and one dose of tobacco juice administered fully 20 years ago, have been our only actions against them. Neither have we any experience whatever with contagious diseases among sheep. Among our sheep to-day is not one poor in flesh nor one from whose pelt the wool has started.

Element of Success.—One of the principal elements of success in any line is patient continuance. He that continually jumps from one line of business or breeding to another, endeavoring to follow all the freaks and turns of trade, will not infrequen ly find himself left when he arrives at the coveted point, and the will-o-the-wisp beacon will again appear in another direction.

Thus far I consider that we have followed sheep husbandry with certain purposes in view, and while success has attended our efforts to an extent fairly gratifying to ourselves, yet not sufficient to warrant us in folding our arms at this point and exclaiming, good enough! But rather, that experience, which has become ours only by years of labor and close observation, only armors us for renewed efforts in a line in which, in connection with clovering, lie resurrecting properties to many an exhausted acre.

THE HANDLING OF SHEEP.

By C. A. HATCH, Richland County, Wis.

Third Paper.

General Management.—Successful sheep farming depends on the close and careful attention to three essential points, viz: Breeding, feeding and the handling, or general management of the flock, aside either from breeding or feeding. A farmer may be a good breeder, and also a good feeder, and yet come short of success for want of good management. By management, I mean the selection of the flock to start with, the culling out of inferior and unprofitable individuals, which is so essential to permanent success, dividing for wintering, marketing wool and mutton, etc. Then let us first consider

The Selection of Breed. — Nearness to market, number to be kept in one flock, kind of buildings to be used as winter quarters, and skill of the shepherd, must be taken into account in determining which of the

breeds will be kept. There are three lines of sheep farming:

1. Where wool is the main object, and mutton the second consideration.

2. Where mutton is the first consideration, and wool secondary.

3. Where early lambs are the main crop, and wool and the mature mutton sheep second.

The wool production can be carried on with the least expense for buildings and attendance, and the product being of easy transportation, can be run with profit farther from a central market; larger flocks of this type of sheep can be kept in one flock, and they will thrive on poorer pasture. The farmer can select no breed that excels the American Merino for this purpose. They are hardy, long-lived, and no breed has ever equalled them in per cent. of wool to carcass. For the

Mutton Production,—Nearness to railroad transportation is essential, for a fat sheep is a poor traveller, and were they to be driven far, the loss in flesh and exhaustion of individuals might consume all profit. There are two classes of sheep adapted to this line of sheep husbandry, viz: The long wools (Cotswolds and Leicestershires), and the short wools, or Downs breeds. The long wools attain the larger weights, perhaps, but require abundant pasture, and small flocks. The Downs breeds, while not usually attaining to as great weights, mature younger, and will stand crowding better. If mutton in the shape of lambs is to be sold, early maturity is one grand consideration, and perhaps for this line alone, no breed excels the Southdowns; others may be equally good, but think none are better.

Stabling.—Good warm stables for winter are essental for lamb raising, which adds to the expense, and an experienced shepherd alone can hope to succeed in this line, for the lambs must be dropped in the middle of winter, when all the elements are against them, and careful, skilful management alone can hope for success.

Slowness of Maturing.—In a wool breed slowness of maturing (which always goes with long life) is desirable, so that one and the same animal may furnish a large number of shearings, while on the other hand early maturity and short life of necessity are to be sought for in a mutton sheep, so that the flock may be quickly changed and sold to be replaced with other and immature stock, for here the profit is made on the growth of the animal itself. In the first case the profit comes from the mature animal. There is really no war of the breeds, for each has it merits and demerits, and adaptability to especial purposes, and if we are wise we will select that breed which is adapted to our particular needs, and not attempt to combine all the good points in one animal. Life is too short, and the chance of success too uncertain. Neither can it be made profitable to be continually changing breeds. Choose your breed adapted by nature and breeding to your purpose, and then stick to it. In order to understand the position of each breed, let us make out a sort of debit and credit account as it were, of their merits and demerits.

The Mutton Breeds.—1. They are more prolific, twin lambs being the rule rather than the exception.

2. Early maturity, which gives opportunity of making the greatest possible growth of carcass, in the least possible time.

3. Good milkers, and attentive mothers which give the lambs the best possible chance.

4. Their size gives them advantage

over the smaller breeds, as the loss in waste between the live animal and dressed meat is smaller comparatively.

5. The quality of the mutton is the best.

Against these advantages, we have the disadvantage of thin fleeces, making them poor shearers, and not giving them the same natural advantages to resist cold, that the thick close wool of the Merino does. They also require better pasture, and more feed per given number, from the very fact of their early maturing qualities, as nature in all her prodigality ever refuses to make something out of nothing, and good fast growth of necessity means good feed, and plenty of it.

The Wool Breeds.—1. Hardy, can stand storms better on account of the fleece being close and compact, which fact also makes them heavy shearers, as compared with their live weight.

2. They can be kept in large flocks with little or no inconvenience.

3. Can live and thrive on poorer pastures, being more inclined to travel over a wide range than the larger breeds.

4. They are long lived, making their life of usefulness frequently extend over a period of eight or nine years.

On the other side, or debit column, we have lack of size, unprolificness, and slowness of growth, and the ewes as a rule are not as good milkers as any of the mutton breeds. After having settled which line of sheep farming you will adopt, and having selected the breed suited to that especial purpose the next consideration is the sheep as an individual, that is

Selection of the Flock.—There are certain characteristics and peculiarities which belong to each kind of sheep, and which will be well to bear in mind, as for instance the mutton breeds require that the hams should be large and heavy, and the general shape of the body be blocky and square built, with a clean neck and jaw, i e., free from any looseness of skin or dew-lap. On the other hand a Merino must have a certain looseness of skin (not necessarily wrinkles) and a dew-lap that extends almost to the point of the chin. While a broad ham and low flank is desirable, with them a thick ham is not really so.

Vigor and strength of vitality are of prime importance in any breed; they give power to transmit qualities to offspring, overcome disease, exposure, and the many hardships which all flocks are more or less exposed to.

This is indicated by strong deep shoulders, short thick neck, and a general roundness of the whole body. The neck of the ram should be straight from head to point of shoulder, or slightly arched; the ewe should have a straight or a slight downward curve. Back should be straight, neither arched nor sagged, tail high set, ham straight or rounded, and broad with low flank. Underline of body straight or slightly curved downward, but never a pinched or grey-hound look; legs short, broad and large jointed.

The Fleece—Should be as uniform as possible, free from coarse hairs on flank and neck, and covering the body well, especially on the belly; no short stiff hairs, and as free from yolk or gum as is consistent with elasticity, strength and luster.

The Merino should have wool nearly covering the face, and the legs entirely, while the mutton breeds should have a clean jaw and clean legs from the knee down.

Uniformity of flock is desirable, so as to get a uniform product, either of wool or mutton, for a great range of quality will not command the highest price in market.

The length of the wool should be

looked to, other things being equal. Length gives value, but always remember thickness gives weight, rather than length of staple.

Culling—Should go on constantly if you would get and keep a fine flock, and the finer the qualities of the flock, and the better the care, the larger the net profit. If a flock be ever so carefully bred and managed, there will always be inferior animals which can be kept only at a loss, and it is the shepherd's place to always have an attentive eye to these points, and turn any inferior or unprofitable animal off as soon as possible, rather than to keep it as a breeder to transmit its poor qualities to the flock through its offspring.

No sheep should be kept after age has begun to thin the fleece, unless for some xtra good breeding qualities, and even then it may be of questionable profit, for may we not thus lower the general thrift and vitality.

Poor Feeding Qualities,—And unthriftiness should send an animal to the butcher, no matter what the pedigree. All animals deficient in size or form should share the same fate, keeping only the best specimens, for with such only can you hope to perpetuate the good qualities, and get the greatest profit. The best one time to cull is at shearing-time; then deficiency of carcass, form and fleece are most apparent and all individuals deficient in any point should be marked and sent to the butcher as soon as the condition of the flock and state of the market will warrant.

As a rule wethers can not be kept with profit after having attained their full growth, for their place can be supplied by breeding ewes, which give, in addition to the fleece, a profit in the lamb, or lambs.

Marketing.—As a rule the best time to sell wool is as soon as it is ready for market; then the buyers are expecting it; competition is sharper and we stand a better chance than to sell out of season, when perhaps buyers are fewer, competition less, and those in the market not over-anxious to take a small lot after having shipped the season's purchase, and the farmer who holds his clip for a rise, stands about an even chance of getting a fall, while those who sell as soon as it is ready, in a course of ten years, will strike the high market as often as the low.

Be sure the fleeces are put up in good marketable shape, nicely tied with not too much twine, and showing only the bright side, that came off next the sheep; reject all tags, dirt, or anything that tends to "load" the fleece, and in the long run you will be the winner, besides having a clear conscience in the meantime.

Washed fleeces have gone out of date in most wool-growing districts, on account of the tendency of the practice to foster fraud, many of the clips being washed only in name, which is a great injustice to the one who tries to do honest work.

One of the strongest points of competition which foreign wool has over home grown, is in this matter of care in tieing and sorting the wool, the foreign article suffering a loss of only from 20 to 30 per cent., while American grown goes from 35 to 75 per cent., the average being for fine about 50 per cent. Can the manufacturer be blamed for wanting a good straight article?

And where does the blame belong, on the farmer who ties the fleece full of rottenness and filth, or on the buyer who accepts such a "whitened sepulcher?"

The latter buys with the expectancy that he will be subjected to a heavy discount, and bases his prices accordingly, while the former who sells his tags at

the price of good wool is not only cheating himself in the long run, but makes a reputation in no small degree for his more honest neighbor, the poor article lowering the price of all coming from a given locality.

Selling Mutton.—Mutton, the other salable product of every sheep farm, should be sold at the time when it brings the highest price, provided there is no extra cost of production to offset this extra price. Winter or spring mutton costs more than fall or summer mutton, but in the spring we have the fleece to offset this and in summer the cheapness of feed, and favorable weather for growth. As a rule, no sheep that have not been grain fed should be sold, whatever the time of year, for no matter how round and plump they may look, a small ration of grain will add much to the weight and quality even on full grass feed.

Time to Sell.—The poorest time to sell is in the fall, when every shiftless farmer is thinning out his flock to make amends for a poor hay and grain crop. Better hold and feed well for a month or two later, get some good manure, fatter sheep, and better prices. Of course winter lambs must be sold in the spring, usually about June 1st., and in my opinion their mother should soon follow, for the high feed which is necessary to get the best results in lambs, has a bad effect on the ewes if allowed to run down again, many of them refusing to raise lambs the next year, and others being so spoiled by their high living that they are like the pampered and high fed belles of the city, worthless for vitality or mother functions.

The shepherd who understands his business, will as a rule make the wool and lambs pay, or more than pay, all expenses and have the mutton sold as clear profit.

Conclusion.—In conclusion I will say, let the farmer breed intelligently, feed intelligently, and handle his flock intelligently, and he is sure of good pay, quick returns, increased fertility of his acres and an ample inheritance for his children.

SHEEP IN WISCONSIN AGRICULTURE.

By GEO. McKERROW, Waukesha County, Wis.

Fourth Paper.

An Age of Progress.—Agriculture is acknowledged by all civilized nations to be their life current. Impoverish this life blood and you impoverish the nation; enrich the current and you enrich the masses. Therefore, we are met here to discuss the different elements of Wisconsin agriculture, and how to improve upon prevailing methods and customs. This is an age of progress, and the farmer, who is the corner stone, the foundation rock, of our country's progress, is fast learning that unless he bestirs himself in his line, he will soon be pushed to the wall by the strong competition of the times.

Have a Specialty.—Diversified farming is a necessity, yet every farmer should have his specialty. Let the man who likes dairying best adopt that. The lover of horseflesh will succeed as a horse-breeder; the man who admires the hog, and thinks him the cleanest of the domestic animals, will succeed in swine-breeding; But of our live stock, none is a more important factor in a complete and successful system of farming than the sheep.

Sheep on High-Priced Land.—We often hear the remark that our lands of Southern and Central Wisconsin are too valuable for wool production. This may be true if you confine sheep-husbandry to wool-production alone. You might as well raise wheat for the straw as to raise sheep for their wool alone on our high-priced lands, with the wool markets of the world in their present condition. The English farmers, who lead the world as successful agriculturists, raise sheep profitably on lands worth from $300 to $500 per acre. You may ask: Why do they do this, and how do they do it? In answer to the first question, I will say that they have found the sheep to be the best of fertilizing agents, a manufacturer that they can not dispense with. He returns 95 per cent. of the fertilizing matter of all the foods that he consumes to the soil. Prof. Stewart, in his "Feeding Animals," tells us that wheat bran is worth $18 per ton as a fertilizer, oil meal $30.48, and clover hay $11.45 per ton. Most of our other fodders are worth as much for fertilizers as it costs to produce them. So you can easily see that the English farmer needs the sheep to assist him in keeping up the value of his high-priced land, and, my friend, we need him. John Johnston, of Geneva, N. Y., changed a poor worn-out farm to one of the best in the country by a system of underdraining and sheep-feeding. Many of us know of worn-out grain farms that have been brought back to a high state of fertility by grass and sheep.

Economical Meat.—Another reason why the English farmer holds to the sheep is because he has found him to be the most economical producer of the best of meat. The eminent experimenter, Sir. J. B. Lawes, tells us that the sheep stores up 12 per cent. of the dry food consumed, while cattle store up 8 per cent., or 8½ lbs. of dry food increases the live weight of the sheep as much as 12½ lbs. of the same food will increase the weight of the bullock. Adding to this the fact that good lamb and mutton are on the average as high or higher in price than veal and beef, and are classed as high in nutritive value as a food, gives us a good reason why John Bull holds to his mutton chop and why the Yankee should reach out for *his* share.

Breeding and Feeding for Profit.—How do they make sheep husbandry profitable on their high-priced lands? They do it by adopting a means to an end. They *breed* for it and they *feed* for it. As civilized nations have advanced in the processes of agriculture, mutton has become the primary consideration of this business and wool only secondary. France improved the mutton qualities of the Merino, and our Merino breeders are now agitating in the same direction. Germany for years has been calling on Englrnd for mutton rams to cross on her Merino flocks, and they tell us that the Down Merino cross is a success.

England, the acknowledged leader in the line of mutton sheep, first improved her Leicesters, Cotswold and Southdowns, but more recently her breeders have developed and brought to the front the Lincoln, Romney Marsh, Dorset

Shropshire, Hampshire and Oxfordshire Downs.

The Leading Mutton Sheep.—Judging from prizes won at fairs and fat stock shows, prices made at sales and lettings, and prices brought in the mutton markets, in connection with statements from agricultural journals, we believe that we are justified in stating that the Downs are the leading mutton sheep of the world to-day. We have tried several of these English breeds and their grades, both as breeders and feeders, and have found the Downs in general to be good prolific breeders of strong, healthy, fast growing lambs, and very quick feeders and, above all, the best of sellers. For these reasons, we advocate as a general-purpose sheep the Downs breed in general and the Oxford-downs in particular. The condition under which the Oxfords were developed, and the purposes for which they were specially bred, fit them to take a very important place in our advancing system of sheep husbandry.

Origin of the Oxford-downs.—In a low, moist, and rich district at the foot of the Cotswold hills the older breeds, such as the Cotswold and Southdown, had been used, but they apparently did not have the constitutional vigor necessary to thrive continuously on the rank, rich herbage of this district. In 1828 a Mr. Hitchman made a cross between the Hampshires and Cotswolds, and in 1833 the Messrs. Druce, father and son, made a Southdown and Cotswold cross. Many others followed suit, and in a few years these cross-bred sheep almost drove the older breeds from this district. By careful selection and breeding, they were soon brought to public notice as a valuable accession to the improved breeds, and possessing a vigorous constitution, prolific tendencies, quick growth, valuable fleeces, and large choice mutton forms, their friends and breeders in 1857 adopted the name, Oxford-down, and soon after they were admitted to the English show rings as a distinct breed. From these rings they annually go loaded with honors.

What Breeders Think of Them.—Richard S. Fay, of Lynn, Mass., and Wm. C. Rives, of Virginia, were the first of our countrymen to introduce these sheep to our shores, bringing over the first lot about 1860. Mr. Fay says of them in 1863:

"I have had no trouble in raising all their lambs, 160 per cent. in 1862 and 175 per cent. in 1863. They thrive well on my rocky pastures, yielding 8 and 8½ pounds of wool per head on the average, in 1862-3 the shorn ewes averaging 135 pounds, and the rams 220 pounds."

T. S. Cooper says of these sheep: "After trying other Downs, I have chosen the Oxford as the best."

Prof. Brown, of the Ontario Agricultural College, who is experimenting with all breeds, says: "The Oxford has unquestionably stood the over all comparison the best."

Geo. W. Franklin, an Iowa sheep breeder and feeder, in an article in a late issue of the Breeder's Gazette: "Though a breeder of Cotswolds, I admit the black-faced muttons bring the best prices, and I think the Oxford-down the best of these dark-faced breeds."

Mr. Hill, of Sheboygan County, in this State writes me that the Oxfords have given him very good satisfaction. His flock has averaged over 12 pounds of wool per head for the past two seasons, and in 1887 his twenty ewes raised him thirty-one lambs, or 155 per cent.

Our experience with the Oxford and its grades for the past nine years has been very satisfactory. They have flocked well; in a lot ranging from 125 to 200 head, have produced from 110 to 135

per cent. of lambs. We have shown them at leading Wisconsin fairs, and have won a large share of prizes, often coming in competition with other breeds. Our grade Oxfords have never been beaten where shown and coming in competition with grades of all kinds. This is pretty good proof that they are a valuable breed to grade up the common sheep of the country.

John Rutherford, of Canada, the largest exhibitor and prize winner of sheep at the last fat stock show held in Chicago, said to me on November 19:

"I know but little of these Oxfords, but the finest lot of mutton lambs I know of in Canada this season are a lot sired by an Oxford ram from Leicester dams. They were April lambs, and I offered $5 per head for the lot in August but could not get them. I bought one for a show lamb that weighs 154 pounds and never had grain or extra feed until I bought him."

Matthew Howitt, of Muckwonago, raised a lot of grade Oxford lambs last season which were dropped in April and sold the 8th of November at $4.51 per head. They were raised on very short pasture without grain. The dams of these lambs sold at auction, March 20, at $8 per head. I could give many more instances of the value of the improved mutton breeds, both in their purity and as factors in grading up common stock.

Heavy Weights.—The English have not only bred well but they have fed well, producing Lincolns and Oxfords that have weighed over 400 pounds at maturity. The younger Druce says our Oxfords weigh, on an average, 140 pounds at 12 to 14 months of age

A pen of Oxfords weighed, at the Smithfield show in 1873, an average of 298 pounds at 22 months old.

Hampshire-down lambs at a year old with fair feed are said to weigh 130 to 140 pounds.

Lincolns under good feeding will dress, at two years old, 120 to 160 pounds, and exceptional ones have dressed as high as 360 pounds.

Early Maturity. — Cotswolds and Leicesters have also been fed up to weights nearly as good at the same ages, showing us plainly that the English do not depend on a straw pile to dedevelop their muttons as too many of us do. They have learned that the great secret of success is early maturity; that if a ewe is poorly fed so that her lamb will only gain 1½ to 2 pounds per week, while another is well fed and her lamb gains 2½ to 3 pounds per week, the lamb of the latter is double the weight of the former at the end of three or four months. It is not only worth twice as much on account of its weight, but its quality makes it three or four times as valuable.

We all know that the yearling that weighs 120 to 130 pounds is worth double the one that weighs only 80 or 90 pounds. We are told by all experimenters that meat can be grown on young animals at ¼ to ⅔ the cost that it can be produced on older ones, and in the case of the sheep it sells on the lamb for from 50 to 200 per cent. more than on the old sheep, a 60 pound lamb often selling for $5, while a 60 pound sheep in tho same market will only bring $2.

Lessons.—These facts should teach us a few lessons:

1. That our lands are neither too good in quality nor too high in price to admit of successful sheep husbandry.

2. That we must protect this industry by good breeding and feeding, which will produce gilt edged lambs and muttons and choice fleeces of good wool.

3. That we must choose sheep of good vigorous constitutions, able to stand high feed and our extremes of a Wisconsin climate.

With these lessons well learned, and our flocks culled of the trash found in many of them, the dawn of a new era in Wisconsin sheep-breeding and wool-growing is at hand—yes, it is actually here. I have met numbers of sheep-breeders during the past season who say their flocks are paying them as well as any stock they handle, with less capital and labor invested. But I find from their conversation that they are all men who appreciate the fact that something of value can not be produced from *nothing*. They are all working for a purpose; therefore their success.

STATUS OF SHEEP-RAISING TO-DAY.

By A. H. CRAIG, Waukesha County, Wis.

Fifth Paper.

Depression of the Industry.—At the present time great interest is felt for the prosperity of the American sheep. It is not the interest which would boom to an excitement, but rather an anxiety, a brooding fear, an anticipated calamity. Nowhere in this broad land of ours do we find one encouraging voice to proclaim cheerfulness and enthusiasm. It seems as though there had been a concerted movement for all to unite and crush out the life and energy which has heretofore been invested in this great enterprise of our people. Not only do we, who breed the American Merino, shake our heads in a pathetic, solemn manner, but we openly discuss the question of a failure, thereby placing a barrier against any possible extension of this business. That man is considered a fool, who will engage in a business where all complain of no profit and no prospect of their being one.

This is the condition of the Merino of to-day. Our farmer boasts that the fine wool sheep, which was his great bank account, has been lost in the darkness which we have been picturing to our imagination. We have forgotten the songs of praise we used to sing when we declared that the sheep never died in debt, that the lamb, the wool, the pelt, always stood as an offering of a well spent life. We have forgotten the strong claims we always advanced, that with sheep the soil became more fertile, our crops more profitable and the advancement to a higher state of cultivation. All these things time and again have we declared as a direct result of the husbandry of sheep. If they were true, then why now turn your backs against these creatures, belie their goodness and abuse their race?

Who is to Blame?—Who is to blame for this want of confidence, this lack of enthusiasm? Is it the man who would engage in its occupation? No. It is you who breed the sheep who must bear the burden of your own folly. You are the ones who have cried against it and brought yourselves down to a disregard of your own convictions. Then what can you expect of the sentiments

of others? They hear the wailing and gnashing of teeth, and hasten to more congenial subjects. They do not stop to investigate your business, and if they did, you would show the dark side of the picture to them. Now, we have had enough of this drivelling idiocy.

Dissatisfied With Prosperity.—The Merino is in no danger and can never be driven from the shores of America. This country is its natural home, our climate is adapted to its natural existence, and our pasturage the most wholesome on the face of the globe. We may have our seasons of depression, but as sure as day follows night the clouds will lift and we shall smile again. Ah, how true it is that, as a people, we are restless and uneasy in our own occupations. We are not satisfied with our apparent prosperity and desire to succeed faster, to accumulate wealth more rapidly. We see the booming of our neighbor's business, and are not content until we get into the same boat. We sell at a sacrifice and buy at advanced prices, and then grumble at the unequal results of fickle fortune's favors.

Losing Their Grip.—To-day the breeders of Merinoes feel as though they had lost their grip upon their prosperity. They see the thousands of dairy factories springing up in every part of the great Central States of our union. They see the success of this system of co-operation. They listen to the practical teachings of the silo and its economical features in dairying. They are taught to treat the cow like a lady. They are shown the great relations which exist in the material intricacies of her organization, and how to profit by the workings of nature. They are instructed how to feed, to water, to milk, to handle. In fact, every particular which leads to the utilizing of nature's forces, and its adaptation to that secret of all success—the economy of our resources. With these careful considerations, we behold the wonderful success of the earnest and determined dairyman.

How Sheep Are Treated.—But who of you ever thought to treat the sheep like a lady, to warm her water, to build a silo, to develop her maternal organization? These men are almost as scattering as hens' teeth. You select your choicest pastures, your choicest hay, your choicest shelter and barn-room for the others of God's creatures, but the poor sheep that supplies us with warm raiment for our rigid climate must almost shirk for himself. They are turned upon pastures sunburned and barren, without one tree for shelter, and often no water but from the wells of heaven. Not only are they left to scratch for themselves during the six months of summer, but often receive worse treatment in the winter. It is a fact, gentlemen. I have known sheep wintered without one swallow of water, or one mouthful of grain, and then yield a handsome reward for the inhuman and cruel abuse heaped upon them.

Do this with the cow, the horse, or the hog, and you would go to the bottom so quick that you would have no time to swim. But here you fairly curse the only industry that will live and bear its fruit under this barbarous, wicked and unfeeling course of treatment.

Stop Your Grumbling—About a debased industry, and seek to build it up. Encourage others and you will encourage yourself. Remember that there is no animal under the blue canopy of heaven so willing in its natural organization to yield to the will of man. Its constitution is the strongest, the spark of life the most tenacious, and its power to produce profit the most certain. It is never in debt but always figures on the credit

side of the ledger. Ah, but I hear a whispered voice say that wool is only twenty-five cents per pound! Do you hear the same voice declaring against butter at a shilling, wheat at sixty cents, and pork at two and a half cents? If wool is low do not jump upon their backs and drive them into the mud. Wait for a reaction, for it will come. Can you point to an industry of importance that has never languished by the wayside? No you cannot, and mark me, friends, do not pin your faith too heavily upon the future successes of the dairy. It is true the cow is a grand animal, a noble animal, an indispensible animal, in our household wants, but who can say that because she is queen to-day that she shall rule to-morrow? Just as sure as there is a cause and effect just so sure will you see a reaction. The wool interest will arouse its own activity, and you who have lost your faith will be too late to feel the enthusiasm which must follow. You will be so deeply confined to other occupations that to come to our side of the house would be worse than swapping horses while crossing a stream.

Sheep vs. Cows.—This to you may be theoretical, but let us for a moment examine the practical side of the twenty-five cent question. Let us assume that your flock of two hundred sheep shears an average of eight pounds per head of good merchantable wool. You receive twenty-five cents per pound. This gives you $200 per head, or $400, all in one lump and capable of accomplishing some object. Your labor has been light, your care not attentive and your independence as perfect as any form of labor can be.

In the place of the 200 sheep you keep fifteen cows, three heifers and five yearlings. This forms the basis of your herd, to match its opposite. Now, remember the average cow of Wisconsin does not yield 150 pounds of butter a year, and that it takes the entire amount of this 150 pounds to pay for her keeping. Again I hear that voice say the yield should be from 200 to 300 pounds, so it should, and follow the teachings of these institutes and you will accomplish it; but show me the man who wins it and I will show you the nine who fall below. Practically speaking the common cow and the common dairy scarcely yield your own labor. In the flock of sheep you have not been sitting on the stool twice a day, 365 times a year. The housewife has not skimmed and washed and churned until her back ached and her limbs grew weak with exertion. You have none of this. You have not been compelled to crawl out of your bed Sunday mornings at five o'clock, because the cows must be milked, nor to hurry home in the evening to sit on the same stool. Suppose your cows have yielded a reward of $25 each, you are still behind the man who kept the sheep.

Possibilities. — Now, gentlemen, I have given you a fair estimate of the two industries, and the Merino sheep still stand at the head; but we will now step to the side of possibilities. We will treat this animal as Mr. Hoard treats his dairy. We will study our own common sense. We will study the requirements of our people and labor in that direction. We will write upon our guide-board, wool, mutton and constitution. The wool for raiment, mutton for food and constitution the foundation of all improvements. The Merino, as I have said before, is capable of any development which we may require of it. There is no reason why this breed should not be a mutton breed as well as that of fine wool. Bear in mind that the present development of the coarse wooled varieties of our sheep is the pro-

duction of man, not of nature. From their native runs they have been bred up to the present standard of excellency. It was man's judgment, man's perseverance, which wrought this change. I mention this, not to disparage their character, but to prove what I shall point out to you. The Merino is just as capable of being transformed into an average weight of 180 to 200 pounds, as to mark the standard of 100. In Wisconsin we never sought to accomplish this object. If anything, we discarded the tendency of this growth. Our selections were aimed to meet a popular craze, a thick set, short legged, heavy folded and wrinkly institution. We disregarded the laws of nature in this superfluous accumulation of skin, wrinkles and folds. Our experience told us that we lost constitution by forcing the animal to generate heat to protect its flabby hide from the frosts of winter, but we bred to sell and every wrinkle was supposed to be worth a five dollar bill. This is no statement of guess-work, for I have been there. I was raised in a thoroughbred sheep-fold and helped breed these wrinkles; but we have got to the end of this curse to the fine wool interests. A reaction has come, and at last common sense will assert its dignity, and this false doctrine must step down and out. We now have no use for it, and there never was but to sell. The demand of the people is for a more perfect construction of all the functions governing the true progress before us. We must economize not only the feed products, but upon nature's natural tendencies.

Old Spanish Flocks.—For a moment let us go back and notice the old Spanish flocks in the prosperous days of Spain. They were the pride of the nation. They had produced in that single development of fine wool a monopoly in the markets of the world, lest other nations should obtain of their flocks and come in competition. Strict laws were enacted to prohibit any to go out of the realm, but the disaster of wars scattered their Cabannas, and the Selicians, the Saxons and the French Merinoes sprang into existence, and although we regard these strains of breeding as offensive to the Spanish, yet they trace to the same stock, the same breeding, the same blood. The Saxons even rivaled the Spanish flocks in their fineness and delicacy of fibre. The Selicians were of the same character, but with the French a different type almost immediately sprung into existence. The people of France lived more for their taste of mutton than for the character of wool. So well did they succeed that 200 pounds became the standard, and to-day their sheep form the basis of the flocks of the Pacific States. They are handled in flocks of thousands. They have all the requirements of climate, of range, of scanty subsistance in times of drouths, and produce a merchantable wool and a mutton that is not excelled by any breed, no matter what claims, and but for our foolish and inconsistent craze we might have had to-day a perfect development of nature's gifts. Pedigree was the wild shout which echoed and re-echoed from Vermont to Wisconsin, and with that pedigree we saw only a bundle of wrinkles, a mass of vanity and the worst form of development which it was possible for us to breed. Pedigree is valuable just in proportion as it is properly applied; alone it can never succeed, but will pass into degeneration and ultimate defeat. I do not wish that you should understand that I place no value upon the pedigree of a sheep; it is our farthest intention to produce this thought, for we do believe that pedigree is valuable according to the

value of the ancestors through which it would trace. But the ancestral blood had been at one time the pinnacle of fame, and yet the line of breeding from that point to this had been a course of degeneration. We would spurn its breeding as unworthy the patronage of the present time. Pedigree alone will ruin the best flock in existence, or, properly applied, will build up the poorest. It may represent vanity instead of substance, or imagination instead of reality.

A Change Must Come.— It is evident that a change must come. We have gone to the farthest extreme of human indurance. We have humbugged and sold until we can sell no more. By the force of circumstances we are compelled to yield to the demands of the times. This is the cause of the general dissatisfaction of the many. A low price for wool and a low standard of mutton bring us into disrepute. Correct this evil, and we shall cease our grumbling and appreciate our industry.

Hints on Crossing.— I would not suggest that you cross your Merino ewes with a hydraulic ram, but cross them with the skill of your own studied judgment. It is for you to say whether it shall be profitable or unprofitable. It is for you to say whether this great industry of the people shall stop at the bottom, where you now find it, or whether you shall lift it up, give it encouragement, sustain its character and mould it into the grand development which it is capable of giving. Cheap lands, as we find from Texas to Montana, can compete with the world in the production of wool on a small scale; but wherever land is worth from $40 to $50 per acre, we cannot afford to waste our raw material. As the dairyman studies his economy, so must we study ours. The future Merino must stand clear cut as a Durham, no wrinkles or folds, weight 200 pounds, fleece without jar, and fibre fine in texture. Had this been our aim when Hammond made the wonderful change, as wrought in his day, where might not we be to-day; but we have the strength of a grand foundation; we have the strength of a perfect system of breeding; we have the strongest character in all the breeds, and it only rests with us to solve the possibilities which lie before us.

Remember, we have passed that stage where wool alone will meet our wants. We must economize in every branch of industry, and nowhere in this grand country of ours is there so broad a place for profitable improvement as in the American Merino.

TO BEGINNERS IN SHEEP HUSBANDRY.

By HARRISON COLE, Dane County, Wis.

Sixth Paper.

Object of This Paper.—It is easy to smite the one that is down, whether it be man or beast, and just now there seem to be a good many trying to bring themselves into prominence by kicking a sheep. Yet, as I believe there is no other animal that contributes so largely to the comforts of man as the sheep, I, for one, shall stand by him. This paper will be devoted to the interests of the new beginner, which is the most critical time for the sheep husbandman, because, if he does not start out right, he is apt to lose money, get discouraged, and give up the business.

Choosing the Breed.— The new beginner must decide what breed he wants; that depends on what branch of sheep husbandry he intends to follow. If he wishes to raise lambs to sell at from eight to twelve weeks old, he must have one or both parents of the coarse wooled variety for the sake of early maturity. If your object is wool and mutton, there is no breed that is equal to the Merinoes. They will herd in large flocks better, and do well on less feed than any other breed. In starting a flock, it is generally the most profitable to buy the best of the kind, but if you lack means, the next best thing is healthy old sheep from a large flock. Put by themselves, they will often renew their age, and prove not a bad investment, but avoid young or middle-aged culls; they lack constitutional vigor, and are the most worthless stock one can purchase.

Breed to a Fixed Type.— Having selected your breed for a specific purpose, press steadily forward, having a fixed type of your breed in your mind, and constantly breed to it, and keep a sharp eye on the men who have made a success of the business you have chosen. Do not mix a little of this breed and a little of that, thinking to get a perfect flock. I have known men to try this, but not one to succeed. If you cross, let it be for a special purpose, and do not breed from the cross. I believe this a good rule to follow with all domestic animals.

Vicious Rams.—Although the sheep is a mild, docile animal, a vicious, ugly ram is a terror, and you should not allow a young one teased, or fooled with, as rams easily contract bad habits, and when vice is once fixed, they are nearly worthless, unless one could confine a few of them with those persons who are so anxious to destroy our wool industry, who would soon cry for protection.

Feeding for Market.—For the past nineteen years I have, to some extent, followed feeding sheep, or fattening them for market. During that time, I have bought a good many flocks of sheep, picked out those that would do to feed, and kept the remainder from one to three years—until they were matured—and then turned them off.

This has given me an opportunity to test the different breeds kept in our vicinity, viz.: the Merino, Cotswold, Lei-

cester, Shropshire, and a few Southdowns. This latter breed, is now extinct in our vicinity, so far as I know. These other breeds, are, as in their order named, for profit, according to my experience.

Coarse and Fine Wools.—I wish to give you a few figures. The pasture and feed that will keep eighty coarse wools, will keep one hundred and twenty fine wools. We will take wether lambs and keep them until they are four years old. The coarse wools will shear five pounds each, or four hundred pounds each year, a total of sixteen hundred pounds in four years, which, at 30c. per pound, will bring, for wool, in four years, $480.

The fine wools, will shear seven pounds each, or eight hundred and forty pounds each year, a total of three thousand three hundred and sixty pounds, in four years, which at 28c. per pound, will give you $940. We will now sell them. If you sell immediately after shearing, and each flock is equally fat, they will sell for the same price per hundred; if you sell from the first of January to the first of May, there is no sheep that sells in the Chicago market equal to the Merino.

The coarse wools ought to average one hundred and forty pounds each, which at 4c. per pound, would be $5.60 each, or $448 for the flock. Add this to the wool obtained from the same flock, and you have a total for both wool and mutton, of $928.

The fine wools ought to weigh one hundred and twenty pounds each, which at 4c. per pound, will give $4.80 per head, a total of $576. Adding this to the wool of the same flock, gives $1,516, a difference of $588 in favor of the fine wools; and I think I have given the coarse wools the advantage, if anything, in these figures.

Fine Wools for Money.—I live in the banner sheep town, of Dane County, and there are but few who have not dabbled with the so-called mutton sheep, at one time or another in their lives, and I have yet to learn of one who made money at it, while the fine wools have been the main prop to many of our most successful farmers. Our soil and climate seem well adapted to the Merinoes, which have improved so much since they were first brought here from Spain, that one would hardly recognize them as belonging to the same family.

Personal Experience.—When I first commenced keeping sheep, I was prejudiced against the fine wools; this prejudice cost me a good deal of money. My flock got to shear less than four lbs. per head. I was disgusted, bought a full blood Merino ram that, when mature, weighed 185 lbs. and sheared 24 lbs. of wool, for which I paid $37. I soon brought up my flock to six lbs. each. I then had two hundred sheep. I think the profit on that one ram was at least $500, and I have since bred as large, broad backed, long wooled sheep, as I could find of this breed.

John Johnston's Experience.—In looking over Randall's Practical Shepherd the other day, I saw a letter from John Johnston, of Geneva, New York, one of the most successful and practical sheep men this county can boast of, who, after thirty years experience, chose full blood Merinoes for feeding purposes. He knew what he was about.

I have been thus lengthy, because most men sooner or later stumble on this point.

Hints on Lamb Raising. — The raising of lambs is an important factor in sheep husbandary. I will give a few suggestions that will be of advantage. First, sort your sheep every fall, putting only those that show good flesh and vigor into the breeding pens. The weak-

er ones, turn with your lambs, first putting a permanent mark on all that are two years old and over. Not breeding from them, they will be apt to flesh up the next season, and then is the time to ship them. In a wild state, the weaker ones would die off, leaving only the more vigorous ones to perpetuate the race. You secure the same result by sorting them. I would also put the non-breeding mark upon all goitered, stiff-necked and puny lambs.

Weaning.— Lambs in large flocks should be weaned when they are four or five months' old, and placed on good, succulent pasture. There is nothing better than a stubble field, with a good growth of young clover (something we have not had for the last two years). Feed a little grain as the feed begins to get short, but a trifle at first; new beginners are apt to fail in this respect.

Dry Feed — Salt and Water.— All sheep should become accustomed to dry feed by degrees, that is, brought in nights and fed, and turned out to graze during the day. Particularly is this the case with lambs. I have lost money at different times by not doing so. All sheep should have free access to salt and water.

Fattening.— I will now make a few suggestions as to fattening sheep. A restless, uneasy animal will not fatten. The first requisite in all fattening animals is peace and quiet. This, all will admit, but how to secure it is not at all times an easy matter. I used to wait until the fore part of winter, prepare my yards, gather in my sheep from where I had bought them, and commence feeding. There were sure to be a few wild ones that would jump and run at the least provocation, which would keep the flock restless and uneasy. I would have hard work to make the flock hold their own, for the first few weeks, while some would fall away.

I next tried letting them run out, coming into the yard during the day if they would, and at night I would shut them in and feed them. This worked better, but was not altogether satisfactory. The sheep being in a strange place, it caused more or less commotion driving them into the yards. The next season I bought and took home my sheep while the feed was yet good in my stubble; turned them near my barns, salted them a little, and, afterwards, to get them used to me, as the feed commenced to fail, I fed them a little grain and put the best hay I had in their racks to tempt their appetites. The result was, I had the heaviest and by far the fattest car-load of sheep that was ever shipped from our market. I have often tried it since, and think it the best possible way to handle a flock of sheep.

The Best Age.— I am often asked at what age do sheep fatten best. I think three, coming four, but all the way from lambs to that age you can pick out sheep that will feed well. I have had good success with lambs, turning them off at ten months' old, but the man who succeeds with sheep must not expect to get something for nothing. It is a profitable animal that pays well for good keep and care.

Rules for Feeding.— Always feed grain in a flat-bottomed, dry trough, if possible, a trifle at first. Increase until you reach to one and one-half pounds each, per day. In damp, muggy weather feed lighter. Be sure and not feed so as to have them leave grain in their trough. Do not disturb them in the morning; let them get up of their own accord and pick around a little before you feed them, like an indulgent mother with her lazy boy. If they do not get up in time

for breakfast you must keep it waiti: ; for them.

Mixed Grains.— I like mixed grains for sheep better than to feed them all one kind, and in coarse feed give them as great a variety as possible, but the same kind at a stated time each day.

Catching.— In catching sheep, be gentle and careful. It does not hurt me quite as bad to see a man catch both his hands into the wool of a sheep as it would to see him snatch his wife by the hair, but it is only in extreme cases that either is excusable.

Feeding Racks.—The best rack I ever saw for feeding sheep hay, and saving your fodder, is made by sawing six inch boards into pieces, two feet and a half or three feet long, and nailing them at each end to two by four scantling, leaving a space six to eight inches between pieces.

Fleeces.—One word about wool, and I am done. A sheep that is in good flesh when it is sheared, and is kept so until it is sheared again, being kept in out of the storms during the time, will produce as good a fleece as it is profitable for *that* sheep to produce on this soil, and in this climate. A sheep that is fat in the fall, allowed to get very poor during the winter, turned to grass in the spring and allowed to gain before shearing, will be very apt to have a cotted fleece. He will at least have a rotton one.

Conclusion.—In deciding whether we can raise wool, or sugar, or any other product, let us not round up like a ground hog in his winter quarters, and say we can't, as some said of the rebellion, you can never put it down, and of our national debt, we can never pay it; but first let us ask, do we need those products, and have we the proper soil and climate to produce them. If so, then let us say, as we have said in times past, by the enactment of wholesome laws, and their proper execution, by a firm reliance on the sons and daughters of a free people, and the blessings of a bountiful providence, we will produce them. Let us know no East, no West, no North or South, but one harmonious whole, and vote in the interests of our country. Then we will have in the future, what we have had in the past, the best country for a poor man to raise a family in and fit them for the stern duties of life, history ever recorded.

Discussion.

MRS. BARLOW.—I want to say, that from our grade Shropshiredown sheep last spring, we sheared 260 sheep, and they averaged eight pounds to the sheep, and I sold my wool at twenty-five cents a pound, and if I had waited two days, I would have got twenty-seven. I am satisfied with Shropshiredowns. I will also say that I have thirty-four lambs which I expect to sell in the Minneapolis or St. Paul market this spring and realize at least $5. apiece for each one of them.

MR. ANDERSON.—I want to say a word for the mutton breeds of sheep. Mr. Cole, as I understood him, said that the coarse wool breed of sheep sheared about eight pounds on the average. Now, my experience is, they shear nearly double that. I had a good many last year that sheared over fifteen pounds apiece. I raise 100 per cent. of lambs from the ewes. Mr. Cole will raise 75 per cent. only from those small breeds.

I want to say to farmers who want to go into sheep husbandry, that they should get the fine wools if they want to, but do get the large breeds. If a farmer wishes to get a few sheep—fifty to one hundred, and I have one hundred in the same yard—let him have the mutton breeds. I had some last year that averaged seventy pounds apiece, and they sold at a good price.

THE COMING HOG.

By THEO. LOUIS, Dunn County, Wis.

Seventh Paper.

Improved Breeds.—It is not my aim to condemn in any wise any of the improved breeds, nor to recommend any particular breed that has been the laborious effort of time, patience, disappointment and success.

Great credit is due to the few master minds that laid the foundation to this great industry; that created from the original, an animal of early maturity and of such shape and build as to satisfy the most critical eye and call forth the admiration of the masses. Even Europe calls on her younger cousin to send back to her the animal that American genius has transformed into typical beauty and a profitable feeder, of early maturity, to improve her herds.

The Kind of Hog We Want.—But dare we rest here? The ever changing conditions of advanced civilization seem bound to say: "You have over-done, or you are overdoing your work." We neither want nor need the large, fat hog. We want the pig fed to lean and fat. The owners of our large pork-packing houses call for a hog of early maturity, that will supply the needs and wants of a foreign and home market. The refrigerators in the packing houses have enabled them to cure the pork with far more safety during the early summer and fall months than in the winter. By what right then dare the feeders and breeders ignore the loud call of foreign exchanges, and the capricious appetites of all classes, from laborers to millionaires? The ever arising question of the day is: "How can we increase export and home consumption, to benefit ourselves, the State, the nation?"

Our Export and Home Demand.—No nation on the earth is better situated to fill this want than the American farmer. We have as large resources for lean and fat as we have for fat alone, and soon some intelligent, thinking farmer will try to meet the demand, even be it at the sacrifice of that typical form, to some degree. We are repeatedly cited to the fact that on the British Isles a strenuous effort is made in the various packing establishments to increase, and convert into hams and bacon, the greater bulk of their pigs, and they consider that at the present time they are competing successfully for texture, flavor and proportion of lean meat with any manufactured in Germany, Holland, Sweden and America.

Shall We Hold Our Own?—And here is an open question: "Shall we be able or willing to hold our own?"—nay, more—to increase our export and home demand for young, juicy and lean pigs for our bacon curers? At present there is but a limited supply of the entire hog product considered a first-class article for that purpose. Our packing and curing houses can only get that class by selection; seldom, if ever, are they offered in car-load lots.

In our own State, we raise nearly a million and a half of hogs, and nearly one million of them are wintered, at a cost of nearly $3,000,000 in food consumed without any material gain in weight, with an aim to increase in size, weight and age—to make the hog a lard cask of ponderous weight at a material increase of cost to the owner, it being a well known fact that it takes one per cent. more of food to the live weight to make one pound of gain. In other words, it takes a greater amount of food to sustain life in the older and larger animal.

THEODORE LOUIS.*

While it has been demonstrated that we should suit the requirements of the market and taste, it will be no drawback, so far as pounds and numbers are concerned. We ought to be enabled to ripen double the number of pigs and more pounds at less cost. The farmer himself is not willing to keep for his own home consumption the animal of large weight and excessive fatness. Why should he wonder, and call it a capricious taste in other classes?

Exports.—There has been a steady increase in the annual export of pork since the year 1821; at that period the exports being $1,254,116, while during the last twenty years the average annual exportation, including hogs with pork product, has been 530,000,000 pounds. If 200 pounds be taken as the average requirements of hogs for exportation, the number has been 2,650,000.

Home Consumption.—The annual home consumption of pork during the same period of time has averaged 4,000,000,000 pounds. The average production for twenty years has been 3,530,000,000, of which 15 per cent. has been exported.

Cheaper Production.—By giving the above figures, taken from the Cincinnati Price Current, of April 22d, 1886, showing the amount of hog product, its export and home consumption, may it not be a stimulant for the active, thinking farmers who feel willing and have the adaptability as to the feeding and breeding of swine for profit, to solve the problems and questions of greater profit by cheaper production, increased fertility of soil and producing as a specialty what the market calls for, and thus be instrumental in increasing export? The time has not come, and probably never will come, when the large number of feeders will desist from exclusive corn feeding, as the crop is so easily obtained and fed, and they will ever look with suspicion on the farmer who pursues a more economical method, considering it an increase of labor without gain in compensation.

It is said that only certain breeds will

*Theo. Louis, was born in the city of Duisburg, on the Rhein, Germany, December 4, 1829; received a common school education; by occupation a silversmith. Came to this country in 1848, as a fugitive, having taken part in the revolution of 1848; landed in Milwaukee July, 4th. There being no employment in his occupation, he went to Two Rivers; worked at lumbering, being employed as second engineer in the mills. From there went to Watertown, worked at distilling. In 1850 went to Galena, Ill., and worked at his trade; from there went to St. Louis and engaged to Prince Nicolas, of Nassau (Germany), and made a trip through the plains and Rocky Mountains, and remained with the American Fur Company at Fort John until 1854; returned to Wisconsin and pre-empted 160 acres of land, where he has resided ever since, as a farmer, and has made the breeding, raising and feeding of swine a successful specialty for a series of years.

answer for the coming hog. It may be and probably is true, that by breeding and feeding we may stimulate a tendency to lay on fat even though the food may not be of that nature to produce fat. If this be true, and it undoubtedly is, if we would strictly adhere to the principle, to feed and rear the breeding stock on either side with a flesh forming food, by liberal feeding and good care we would have hogs of early maturity.

But in all this, we should never lose sight of the fact that a breeding animal, selected for that purpose, should be capable of digesting and assimilating a large amount of food. The proportion of food required to supply the waste of the tissues and keep the animal machinery in working order is less than when a smaller amount is consumed. If other points are hereditary, this is one of the essential points.

Rearing and Feeding.— How shall we rear and feed the coming hog? Shall we winter him? I hear every intelligent farmer say, "No." Shall it be the early pig of March and April? Many will respond, "Yes." Let us consider the best way out.

The early March pig is subject to many dangers, at the tender age of infant life, in the hands of the average farmer, with few conveniences for proper shelter. But why is it that there is seldom, even on well regulated farms, any provision made for the animal that gives such large and quick return for food consumed and care bestowed? Think about it. Again, the early bred pig is ready for the market when the prices are the lowest and the markets glutted —November and December. This being true, it is also true that he excels his eighteen months old brother in cheapness of production, if left with the dam to nurse until twelve weeks old, she being liberally fed with a warm, well-balanced ration of shorts, oats and corn meal, with a ration of oil meal and a portion of bran, changed sometimes to corn on the ear, and the little fellows having access to some whole oats. Care should be taken to never overfeed the sow. Once off her feed, she will fail to produce milk, and it is often difficult to get her digestive and productive powers regulated again.

Clover and Peas.—The clover field must go hand-in-hand with good feeding, but on stormy days the litters are by far safer with plenty of green cut clover in their pens. By July there should be a field of peas, where they grow and do well, next to the clover field. A place should be provided where the little fellows will have access to them, or soiling with them should be resorted to, it being the more economical. At that time it will take less concentrated food at regular feeding hours. These last mentioned "regular feeding hours" are of vast importance. They should not be allowed to stray all over the farm and in adjoining wood lots. If confined at night to well regulated stables and well littered yards, we will receive a large return for food consumed in the most valuable manure. They should be promptly returned in the morning after feeding to their respective fields. Little, if any, manure will be lost, and so a steady increase in the fertility of the soil will be the result. By such methods of feeding during the summer, and feeding or ripening the animal on a nice food of squash, shorts, oats, peas and corn meal, while the bulky nitrogenous food has distended their stomachs, they will have carrying room, and will ripen rapidly into the desired coming hog.

But, far from being satisfied with the above result, indisputably true, we dare

not rest here. The result achieved at our Experiment Station and elsewhere this past year, to preserve one of the most valuable foods for pigs—clover—in a green and succulent state in the silo, will open a wide and unexplored field for the coming hog; a field of greater profits with more certainty, and will gain a decided advantage over the marketing of the last method. From my own experience and that of others, I know it to be true that a pig or shoat can be wintered on clover hay, cut and moistened with either steam or warm water mixed with ground grain, at less than half the cost of the usual method of corn and water.

Value of Succulent Food.—It is not my place here to give the advantage gained in securing the clover crop over the old way, but to have from twelve to thirteen tons of green succulent food from one acre—food that the hog loves—opening a new era in the production of pork. First, it would enable one to breed in May or June, or in August, when there is little danger connected with breeding as to loss by over-laying by the sow, dying from thumps, or scours or chills. (The losses from this last source are often very large in cold and backward seasons); or by sows eating their young, by being constipated, being fed a highly concentrated or conbonaceous food. We shall have the advantage of two summer seasons of clover pasture, and peas and squash can be fed to great advantage to the young growing animal in the fall and early winter, while the clover ensilage mixed with cornmeal will give a well balanced ration toward the desired object—lean and fat—the coming hog.

Sleeping Quarters.—But one should not forget that when we feed a summer ration in the winter, sleeping quarters and shelter must coincide with it. Warm, well ventilated, clean quarters, free from dust and filth, are essential to the coming hog. When so wintered, on the cheapest of food, with a daily paying growth, he is ready, at the option of his keeper, to be fitted for April, May June, September or October market. If breeding sows are selected from August litters, so as to breed them the next season, it will help many to overcome the ruinous practice of breeding from immature stock.

Breed from Mature Stock.—Where swine breeding and feeding is relied on, on a larger scale or as a specialty, it should be ever the aim to breed from mature parent stock, and have litters come as near of one age or time as possible, so as to have the herd of like growth and size, ever trying to gain a reputation with pork-packing houses. There is, also, at our large cities, a large and profitable market to be found. It is as easy and cheap to preserve meats well as it is to preserve them badly, if we are furnished with good rules and observe them.

The hams of Westphalia and the bacon of Ireland are unrivaled in reputation. Why not equal or excel them? Little will be in the way of the progressive, thinking farmer of Wisconsin, with large pork-packing houses on the South, East and West borders, with large cities as great consumers, to make "the coming hog" a paying industry.

Discussion.

QUESTION.—I want to ask Mr. Louis how his clover ensilage is treated—whether as corn fodder, whether it is cut up and left in that manner, or whether it is laid two or three feet deep for heating, or whether it is filled right up to the top of the silo at once.

MR. LOUIS.—All we did was to take up the clover after it had been cut by

the mower, put it on the wagon, draw it to the silo and left it until it was heated; then spread it around and put on some tarred paper. It was not much wilted.

QUESTION. Did you fill the silo in one day, or was it subsequently filled?

MR. LOUIS.—There was not enough clover to fill it; it all went in at one time. We have obtained 27,000 pounds of green clover from an acre, and I think the farmers may well consider the importance of putting clover into the silo. It is very valuable for hog and sheep feeding.

THE CHAIRMAN.—There has been a request that Prof. Henry have five minutes to tell us about his experiments in feeding hogs.

PROF. HENRY.—I wish to say to the farmers, that since at present we are the only experiment station in this country that is carrying on the work of experimenting in feeding hogs, I see nothing ahead of me but this work. I want you to remember that what we are doing now is only preliminary work. You must be patient, and not say "is this work practical." It is not practical at all, not directly practical. We have now completed our third experiment in the so-called feeding for fat and for lean. These pictures which hang about the room represent our third experiment. We have two experiments on the way. In the third experiment, we took one lot of pigs and fed them one part corn-meal, and three parts skim-milk. Another group got shorts, two thirds, and corn, one third; the third lot of hogs received nothing but corn-meal.

Now, the corn-meal fed hogs made a very heavy hog with a large amount of fat; the shorts ration made a small hog, the smallest of the three, but I think, all things considered, that the hog had the most lean meat; it had the most blood in it. We found in the shorts fed hogs, about three pounds of blood to every hundred pounds of live weight, while in the corn fed hogs there were only two pounds of blood, a difference of fifty per cent. Skim-milk fed in conjunction with the corn-meal made the largest hog, and the meat stood up well, although the fat was not quite so solid, as the pure corn fed. Figuring on the cost, allowing corn-meal at forty-five cents a bushel, and figuring skim-milk at twenty cents a hundred, and shorts at fourteen dollars a ton, the pure corn made the cheapest feeding. The skim-milk made the next, and the shorts made the most expensive.

I will say, that so far as our knowledge goes, there is nothing cheaper to-day for fattening a hog than corn, but we must not deceive ourselves upon that. While we will always feed a large quantity of corn, when it comes to growing our animals, and caring for our breeding stock, we must have clover. We must give them protein food. There is not enough ash material in corn to make the proper bones, and, as Mr. Louis suggests, if we will only feed phosphate rock or something like that to our hogs, something to give bone material, it will make up for that lack. To those farmers who can, I would say give your hogs blue-grass pasture and clover pasture. To the breeder of hogs, give them shorts, bran or something of that kind, but for fattening hogs give them all the corn you please. There ought to be as much variation in pork as there is in butter.

A gentleman in Chicago said: "I pay twenty-five cents a pound for all the bacon I eat. I would rather patronize home industry, but I cannot get any such bacon in America, and have to get it from across the water and pay twenty-five cents a pound."

Now, I will say, farmers, be patient with us in our experimental work. I think we will be on that work ten years

yet, but I hope, when the time comes, that we will have enough return to warrant the expenditure.

We have two experiments now in progress on the farm. The first lot we are feeding, the main part blood, and I don't know but that is going to be the cheap food yet. It is being sold as a fertilizer. I don't know but we had better feed it first and use the droppings for manure, as we feed bran and use the droppings for manure. We are feeding peas. Any of you who will visit the University farm may see the two lots of hogs, and when you read the report next year, you will be familiar with the appearance of the animals.

SUPT. MORRISON. — Mr. Gregg, the Superintendent of Farmers' Institutes of Minnesota, has been with us during the entire sessions of this institute, and I would like to call him out and introduce him to our farmers, as they have been engaged in Minnesota in the same work that we have for the past three winters.

MR. GREGG.—Mr. Chairman, I appreciate the courtesy that calls me here just for a few moments, and it would please me very much if I had time to dwell somewhat at length upon the interests of the work as we have found it in our own State, because I want to say right here that we feel indebted to Wisconsin for that measure of success which we have already attained, and we hope, in the coming circuit that we shall commence on the 15th of May, that we shall be inspired with the enthusiasm and wisdom that comes from our sister State. We want to have enough of that self-confidence that always insures success, but we have not enough of the sublime quality that leads us to believe that we have grown to be as big as our mother Wisconsin. We are doing our very best, if I may use the expression, to "get there all the same," and I think we can safely say, in view of the circuit which closed last Saturday night at Mankato our winter's series of the institutes, that the work in Minnesota is well established upon a solid foundation, and we hope that in the future the work in our State will do as much for our agriculture as it has already done for Wisconsin. I believe that the people of Minnesota will come to appreciate that work better.

I think now is a proper time for me to say one word for the press of Wisconsin. The press of Wisconsin has been exceedingly wise; it has been loyal to her best interests, and the pages of her best papers have always voiced the glory of Wisconsin, and I hope the papers of Minnesota will learn to be as wise as they.

I wish to leave you with these few words; may the success of the past be far out-stripped by the success of the future, and we shall go back home with the very best intentions to make our success as great as possible for us.

SWINE-RAISING IN WISCONSIN.

By GEO. WYLIE, Columbia County, Wis.

Eighth Paper.

Hogs at the South.—A few years ago an enterprising Ohio swine breeder conceived the idea of working up a trade for his surplus stock at the South, and accordingly entered a few of his best swine for exhibition at the North Carolina State Fair. He was much surprised, after being on the grounds two or three days, to find that his fine pigs attracted no attention whatever, and more so to find admiring crowds around the pens containing native specimens of the true "elm peeler" type exhibited by the North Carolina farmers. Our Ohio farmer finally approached a native "tar heel," and asked: "Why is it that those 'razor backs' over there attract so much notice, while these wide backed, heavy quartered, short legged pigs of mine attract no attention whatever?" The "tar heel" rolled his quid from one side of his mouth to the other, looked wise, shut one eye, squinted at the Ohio man with the other, and said: "Stranger, we uns can't make nothin raisin no hog that can't run faster nor a darkey!"

Our Ohio friend found he had been breeding in the wrong direction to supply that particular market; he had been breeding a hog that gave the largest returns in weight for the feed consumed, while the North Carolina farmer wanted a hog with good wind, long legs, and capable of covering twenty feet at a jump—an animal in fact whose greatest recommendation was running fast.

Hogs in Wisconsin.—In Wisconsin we haven't the darkey to contend with and have made very great improvement in the quality of our swine in the past ten or fifteen years. Still we have altogether too many farmers who keep swine better adapted to running, than making pork. The successful breeding of swine needs constant care and watchfulness, and here is where the average farmer fails. The tendency of all swine is to revert back to the original type, and it is only by careful selection of the best, and by judicious mating in the hands of experienced breeders that they are improved or kept at their excellence. The generation of swine is so short, they increase so rapidly and reach maturity so quickly, that they furnish plainer lessons and demonstrations of the science of breeding than any other class of live stock.

Difficulties to Overcome.—The young man anxious to become proficient in cattle breeding could obtain valuable information by practicing with swine for a few years, and even the horse breeder (if he would only condescend) might learn here in a short time things pertaining to the breeder's art that have taken him a life time to learn by actual experiment. One of the greatest difficulties to successful swine-raising among our average farmers is that they persist in regarding swine as hogs, and in treating them as hogs. They are usually con-

sidered as being a step lower than anything else on the farm; they are made to rough it around straw-stacks, and act as general farm scavengers. Where they are kept at least on an equality with other farm stock, the income from their product is found to be more than correspondingly increased.

Points of Excellence—The Head.—In the limited time at my disposal, it is impossible to go into details of the different points that go to make up a first-class hog. But I will allude briefly to a few important qualifications. In selecting an animal, the head is an important index to the character of the beast. A horseman would scarcely buy a horse without looking at his head, and cattlemen are always talking about "mean" heads, or "sweet" heads, but I believe in the hog's case the head is a surer indicator of the qualities of the animal than in either of the other. If you want a hog that is never satisfied with what you give it, and is always looking around the fence for a hole to get out, get one with a long sharp nose, and narrow between the eyes. But if you want one that will eat what you give it and lay down satisfied, get one wide between the eyes, with a short nose, and a face slightly dished.

The Legs and Back.—The front legs set wide apart indicate constitution and vitality. He should have a wide, straight back, with a well sprung rib, and be well filled out around the heart. The limbs should be strong and tapering, made for holding up weight rather than moving fast.

There are many other points that a breeder would consider, but if the average farmer has swine with these points well developed, he can rely on having those that are at least profitable feeders.

Improving Breeds.—Having such a hog, the question is, how shall we hold him at his present excellence, or if possible, improve him. If your hogs are Poland Chinas or grades of that breed, then get the best pure bred sire of that breed obtainable; get him strong in the points that your present stock lack, and keep right on in that line. If your stock is some other breed, and you are satisfied with it, do the same. There are enough different types of the same breed in any of our improved breeds of swine to supply any variation that may be necessary, and with far better results than if the type wanted were taken from a different breed.

Crossing.—"Don't make hash of your breeding," is just as applicable to swine as to anything else. Good results are sometimes obtained in swine raising in the first cross, made by breeding together pure bred animals of two distinct breeds. While this is true of the first cross, the identity of the bloods become last in the next cross, and they quickly lose the characteristics of the original stock and degenerate rapidly. The infusion of fresh blood from either of the original breeds, or from some other pure breed, does not appear to have the good effect on stock thus bred, that it has in other cases. Thus what is gained in the first cross is lost in the subsequent ones. The only excellence then is in the first cross but the additional expense of keeping two distinct breeds, so as to always have the benefit of that first cross is not compensated for in the increased excellence of the stock. Conditions and circumstances have given the United States the best swine and the best breeders of swine in the world. And they have perfected a breed, or several breeds for that matter that, each in itself distinct from all other breeds, can give as large or larger returns, and with more certainty than can be made with any cross or grade. And these breeds are all easily obtained. Life is altogether

too short, even when swine breeding is considered, to waste time in aimless crossing together of different breeds, or in using an animal of one breed one year and another the next.

Feeding.—The proper feeding of the right kind of food cuts a greater figure in breeding good stock, especially swine, than most farmers appear to think. With improper food, the best pigs of the best breed in the world can be ruined in a single generation. For substantial proof of this assertion, I have only to cite you to the most valuable feeding experiment ever made in the United States. I refer to Professor Henry's recent experiment in "feeding for fat and lean." Here we have a practical and conclusive demonstration of the injurious results of an exclusive corn diet. Had those corn-fed pigs been reserved for breeders, and bred with stock fed in the same manner, would it be any wonder if their stock should lack constitution and vitality? Yet those pigs were fed just as thousands of our farmers feed their breeding stock, and when their pigs die of fatty degeneration when young, or become victims of cholera when older, they call it bad luck, when the real cause, nine times out of ten, could be directly charged to feeding the stock and their ancestors too heavily on corn. No pig intended for breeding purposes should ever he fed over one-third of its entire ration on corn. While corn is just the thing for finishing up animals intended for market, its lack of muscle and bone forming material makes it ruinous for those intended for breeders. As a feed for a growing animal it is lacking in the material necessary for a good strong foundation, and does not furnish muscle enough to hold the structure together.

Keep Mature Brood Sows.—Another important point in maintaining the quality of your swine is to keep mature brood sows. They raise stronger and healthier pigs, and more of them at a given age; and your breeders for the coming year should always be selected from that class. Young, half grown brood sows, with corn for feed, are sure to bring disaster in the end.

Farmers who rush into swine when pork is high and out of swine when pork is low, seldom make any money in the business. But the farmer who keeps at it for a term of years, breeds and manages them intelligently, will find that they bring larger and quicker returns for the money invested than any other class of live stock.

PLAN FOR A MODEL HOG-HOUSE.

The following admirable description of a model hog-house is taken from the fifth annual report of the Wisconsin Experiment Station, to the Director of which I am indebted for the use of the cuts herewith. It was prepared by Mr. L. H. Adams, Farm Superintendent:

It will be borne in mind that this hog-house is arranged especially for feeding experiments; the practical breeder and feeder can introduce such modifications as will meet his requirements. By referring to the ground plan it will be seen that the dimensions of the building are 70x24 feet, outside measurement, with 16 foot studding. It should be placed with its greatest length east and west, with sleeping rooms and yards on the south side for sunshine and warmth. At one end of the building a weighing and store-room is entered through a door sufficiently wide to admit a swill cart. This room is 13½x24 feet, and is provided with a chimney and all the facilities for heating water, weighing hogs, etc. A feeding alley four feet wide leaves this room and extends the entire length on the north side of the building. In the plan as here given, there are seven pens, each seven feet nine inches wide in the clear; a tight partition reaching to the ceiling, 6 feet 11 inches back from the feeding alley divides these pens into two apartments, and the feeding and sleeping rooms. This partition also serves to support the joints for the upper floor.

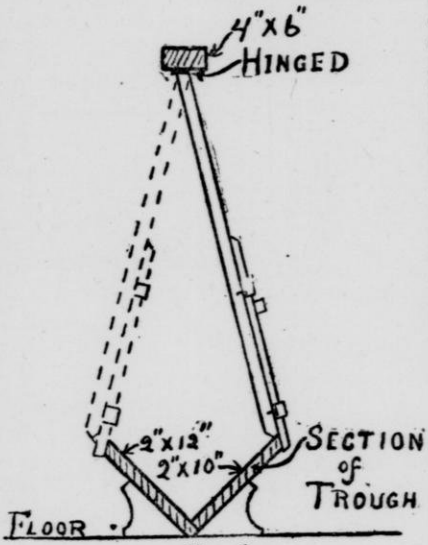


FIG. 1.

It will be observed that no more space is given up to the feeding rooms than is absolutely necessary, as the hogs are driven back to the sleeping rooms after each meal through small doors (designated by dotted lines in cut No. 2) that slide up and down in grooves and are operated from the feeding alley by means of ropes that run over two small pulleys screwed into the ceiling. A large entrance to each of the sleeping rooms is also provided, so that an attendant may enter any pen without disturbing the occupant of the adjoining ones. The partitions that separate the feeding rooms from each other are three feet high. A series of doors, three feet wide, through each division, afford a satisfactory means of handling the hogs, either on the scales, or when loading them into wagons at the opposite end of the building.

A very convenient device for keeping the hogs back from the trough when pouring in swill (see cut No. 1), needs only to be seen to be understood and appreciated. It is a simple door hung over the center of the trough that swings and catches on either side of it by means of a wooden bar that can be raised up and down through iron staples. A 4x4 is sufficiently strong to support these doors; in the cut it is represented as 4x6 through mistake.

We now come to the sleeping rooms, and as these are where the hogs spend most of their time it is important that they receive careful attention. These rooms are eleven feet five inches by seven feet nine inches, inside measurements, and occupy the southern portion of the building. Each room is ventilated by means of a shaft two feet square, that reaches from the ceiling to within three feet of the roof (see cut No. 3). From this point the foul air escapes through a ventilator on the top of the building; the

draught is regulated by means of a sliding door at the bottom of each shaft. By making openings into these chutes in the upper story, an excellent means of distributing bedding to any sleeping room is provided. Sunlight enters the sleeping apartments through windows four feet wide and two feet high.

We now come to another important feature of the building that must be considered in connection with the sleeping rooms, for they should always be together. I refer to the series of yards on the south side of the building. Each pen has a yard in connection with it that reaches back sixteen feet. Constant access to this yard is had by means of a small door that is left open all the time, unless the weather is very cold, so that all droppings may be deposited outside of the building; this will be done if the yard is not allowed to become clogged up with litter and filth. The outside fence of this yard is made permanent, with a substantial gate hinged at each end (see cut No. 3); the division fences are made so that a ten foot panel may be lifted out to allow a wagon to pass through and gather up the manure. It is not advisable to have these yards reach back more than sixteen feet on account of the extra work in keeping them clean and gathering up the manure.

Mr. Theodore Louis, a prominent and successful swine breeder of this State, has suggested that these yards be floored with plank laid in water lime, in order to keep out vermin and reduce the loss of manure to the minimum.

Now a word about the height of the building. Our farmers are coming to learn that the foundation, floor and roof of a structure are the expensive portions, and, as storage capacity is always in great demand on the farm, why build a one-story hog-house when a little more outlay for boards and studding, gives such a large upper room for bedding? or if not wanted for that, it will be an excellent place for storing farm tools away for the winter, plows, harrows, cultivators, and those tools that are only used for a short time in the summer.

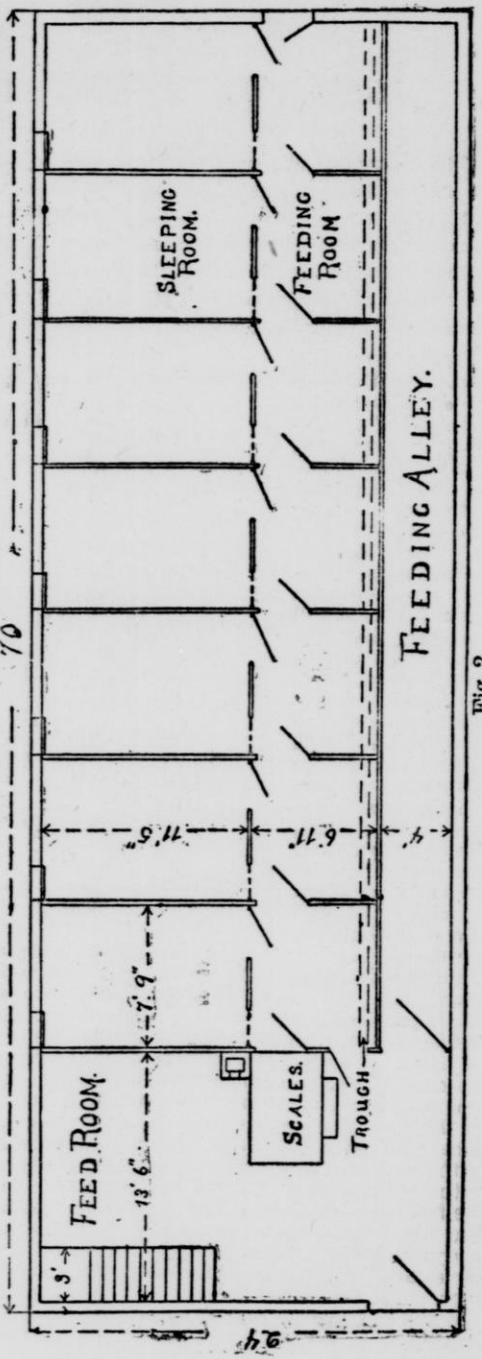


Fig. 2.

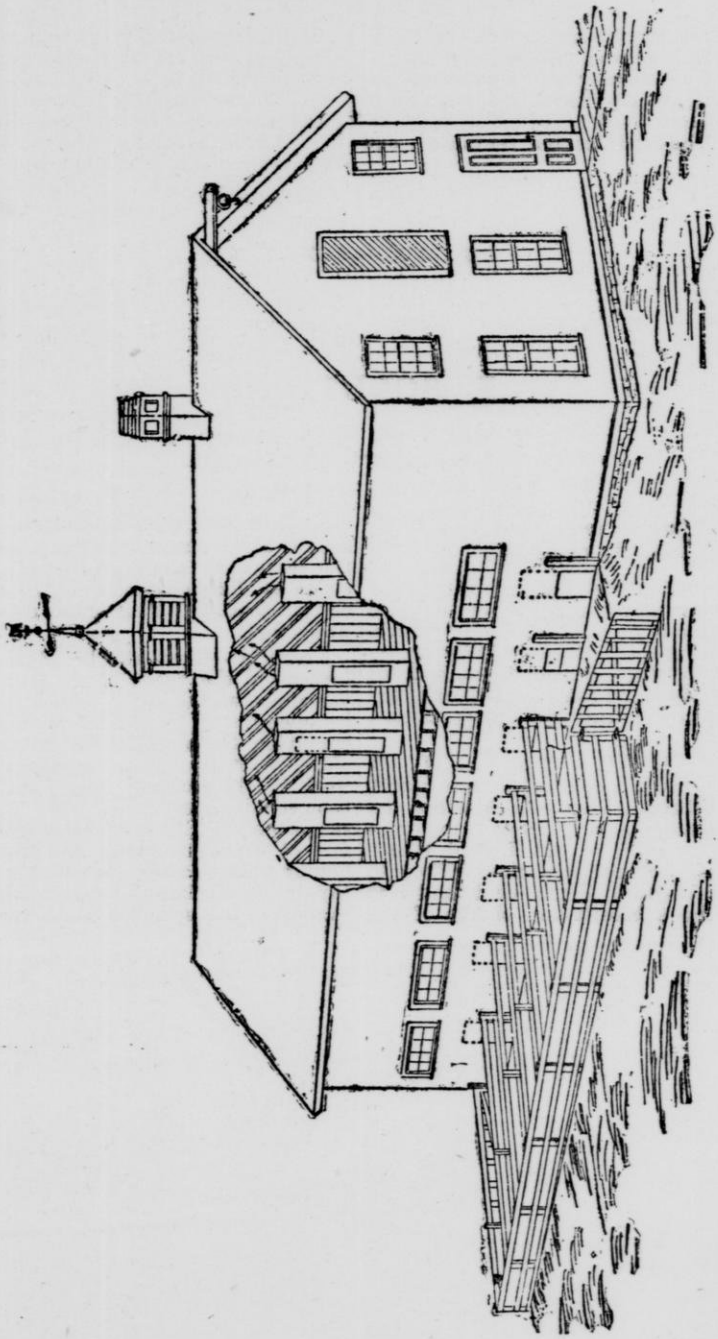


Fig. 3.

To sum up, the features of this building which we wish to emphasize are:

1. The manner of separating the sleeping rooms, which insures a clean dry place to feed.
2. The facilities for ventilation and light.
3. The system of yards by which the sleeping rooms are kept clean and the hogs permitted to have exercise at will.
4. The details of the interior arrangement such as the width of pens, disposition of doors, etc., may be varied to meet the requirements of the builder.

RESOLUTIONS.

The following resolutions were introduced by Hon. H. C. Adams:

Resolved — That the generosity of the railway companies doing business in this State in granting a half-fare excursion rate to this institute is fully appreciated by those in attendance, and for the courtesy and consideration received we hereby return our most earnest thanks.

Resolved — That President T. C. Chamberlin be requested to correspond, in our behalf, with our Senators and Representatives in Congress in reference to the transfer of the United States Weather Service from the military to the agricultural department, and also with the authorities in charge of the weather service, with a view to securing such a reorganization and extension of the service as shall give greater precision and local adaptation of the weather forecasts, and their more complete utilization.

Resolved — That the broad comprehension of the needs of the farmers of this State, and the strong executive ability manifested by W. H. Morrison in supplying those wants in the line of plain, practical, effective educational work in the Farmers' Institutes, have been strikingly exhibited in all the arrangements for the instruction and comfort of this convention, and that we hereby pledge to him our active sympathy in developing the farms and the farmers of this splendid commonwealth

CLOSING REMARKS.

By the Superintendent.

The program of the last of a series of eighty-one institutes held in different parts of the State is completed, and I hope the suggestions, comparison of methods and exchange of ideas will stimulate and inspire the farmers of the State to more systematic business ways on the farm. I know many go from these gatherings apparently more reliant and stronger, thinking more of their farms than ever before.

The farmer is one of a class of workers that is isolated, and he needs to learn from and by the work of others. We have often heard it said that "the man who makes two blades of grass grow where but one grew before" is a benefactor to his race. But what praise and commendation will you give to Hiram Smith, C. R. Beach, Theo. Louis, W. D. Hoard, J. M. Smith, C. P. Goodrich, F. C. Curtis, and a host of others, who have not only doubled the grass crop and the products of our domestic animals, but who willingly teach others to do the same by their example and advice.

The institute spirit will eventually permeate every farming district in the State; will increase our wealth, educate our farmers, bring them into sympathy with our State University and make them proud of its advantages.

I feel exceedingly thankful to the farmers of the State for the assistance they have given me, knowing that many of them have made sacrifices in farthering this great educational work; but they have the satisfaction of knowing that he who goes into a locality where agriculture is backward, and by better methods of farming doubles or trebles the ordinary products of the farm, patiently and unselfishly giving his experience to inquiring neighbors, is a nobleman of the highest degree.

I hope that the day is not far distant when, instead of eighty institutes, we shall have five hundred scattered all over the State, and that the mutual inspiration and stimulus which will come from this contact and exchange of ideas will dignify and exalt farming, make better farmers, better homes, and better citizens.

THE CHAIRMAN.—With this, the last of eighty-one institutes comes to a close.

A Great Railway.

The Chicago, Milwaukee & St. Paul Railway Company now owns and operates fifty-six hundred and seventy-five miles of thoroughly equipped road in Illinois, Wisconsin, Minnesota, Iowa, Missouri and Dakota. Each recurring year its lines are extended in all directions to meet the necessities of the rapidly populating sections of country west, northwest and southwest of Chicago, and to furnish a market for the products of the greatest agricultural and stock raising districts of the world. In Illinois it operates 316 miles of track, in Wisconsin 1,309 miles; in Iowa 1,572 miles; in Minnesota 1,122 miles; in Dakota 1,216 miles; in Missouri 140 miles, and the end is not yet. It has terminals in such large cities as Chicago, Milwaukee, La Crosse, St. Paul, Minneapolis, Fargo, Sioux City, Council Bluffs, Omaha and Kansas City and St. Joseph, Mo., and along its lines are hundreds of large and small thriving cities, towns and villages. Manufacturing interests are cultivated, and all branches of trade find encouragement. The Railway Company has a just appreciation of the value of its patrons, and its magnificent earnings are the result of the good business tact which characterizes the management of its affairs.

The popularity of the line is attested by the fact that notwithstanding the strongest kind of competition of old and new lines, the Chicago, Milwaukee & St. Paul Railway continues to carry the greater portion of all the business between Chicago, Milwaukee, St. Paul and Minneapolis. It is the best patronized route between Chicago, Council Bluffs and Omaha and to and from all points in Wisconsin, Minnesota, Dakota and Iowa, and its Kansas City and St. Joseph line will undoubtedly take equal rank with the older lines leading to and from the Southwest.

On all its through lines of travel the Chicago, Milwaukee & St. Paul Railway runs the most perfectly equipped trains of Sleeping, Parlor and Dining Cars and Coaches. The through trains on all its lines are systematically heated by steam. No effort is spared to furnish the best accommodations for the least money, and, in addition, patrons of the road are sure of courteous treatment from its employes.

Pullman Vestibuled Trains.

It is universally conceded that, notwithstanding the advent of old and new lines into the field of competition for passenger traffic between Chicago, Milwaukee, St. Paul and Minneapolis, the Chicago, Milwaukee & St. Paul railway maintains its pre-eminent position as the leading line, and carries the greater portion of the business between these points. It is not hard to account for this, when we consider that it was the first in the field, and gained its popularity by long years of first-class service. It has kept up to the times by adopting all modern improvements in equipment and methods, the latest being complete Pullman Vestibuled trains running daily between Chicago, Milwaukee, St. Paul and Minneapolis, and its route being along the banks of the Mississippi, through the finest farming country, the most populous and prosperous towns and villages, it offers to its patrons the very best service their money can buy.

Its dinning cars are celebrated throughout the length and breadth of the land as being the finest in the world. Its sleeping cars are the best belonging to the Pullman company, being marvels of elegance, comfort and luxury; its day coaches are the best made, and its employes, by long-continued service in their respective capacities, are experts—courteous and accommodating to all.

It is not at all strange, therefore, that an intelligent and discriminating traveling public should almost exclusively patronize this great railway.

W. K. STAFFORD & CO.,

—IMPORTERS OF—

CHINA POTTERY,

GLASS AND LAMPS.

Largest Retail Crockery House

IN THE NORTHWEST.

We Make
—A—
SPECIALTY
OF
FINE GOODS
FOR
WEDDING
AND
ANNIVERSARY
GIFTS.

LARGEST
ASSORTMENT
OF
CROCKERY
AND
GLASS
For Every Day Use
to be found in the
Northwest.

HOTEL AND RESTAURANT GOODS.

DINNER SETS

OUR GREAT SPECIALTY.

PIANO LAMPS IN GREAT VARIETY.

CALL ON US WHEN IN THE CITY.

414, 416 MILWAUKEE ST., MILWAUKEE.

☞ *Mention "Farmers' Institute Bulletin" when writing to Advertisers.*

A.W. RICH & Co.

THE GREAT BROADWAY

DRY GOODS HOUSE,

Better Known as Rich's White House,

The Model Dry Goods Store of Milwaukee,

AND GREAT POPULAR HEADQUARTERS

For all that is new, novel, standard and desirable in imported and domestic Silk, Wool and Cotton Dress Fabrics, Ladies,' Misses' and Children's Cloaks, Shoes, Millinery, Books, Curtains, Novelty Art Wares, Druggists' Sundries. Ladies' and Gents' Furnishing Goods, Etc., at prices equaled in but very few instances and surpassed in none.

THIRTY-SIX DEPARTMENTS complete in every detail.

FOUR IMMENSE FLOORS filled to their utmost capacity, and connected by two safety elevators and broad stairways.

51,000 SQUARE FEET of floor surface.

OVER $300,000.00 WORTH of merchandise of every name and nature for men, women and children.

ONE MILE of counter room.

VISIT OUR STORE for special and exclusive features of both pleasure and profit for old and young.

WE SHOW GOODS to visitors with the same degree of courtesy as to purchasers.

CONSULT YOUR OWN INTERESTS by making comparisons before buying.

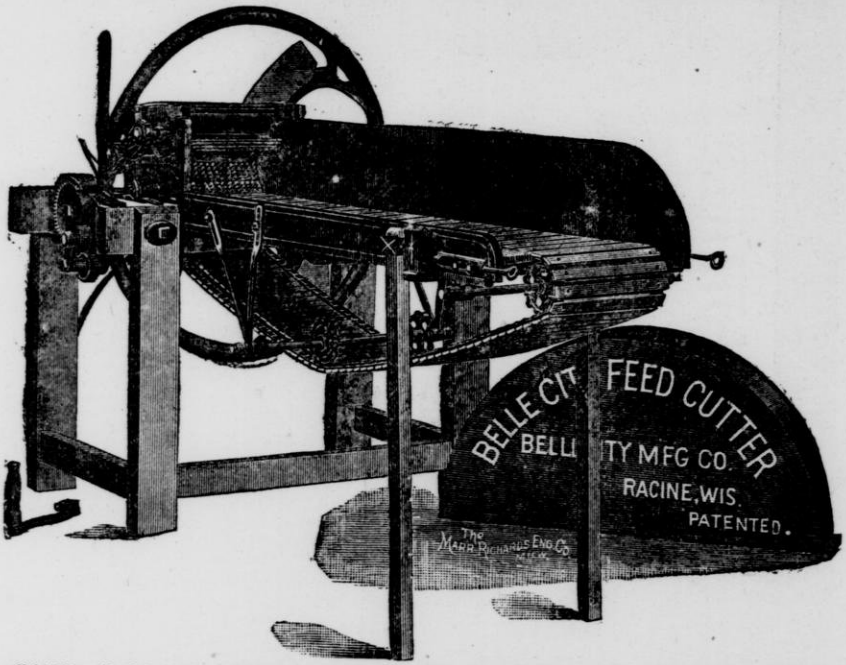
SHOPPING BY MAIL.

Through our well organized Mail Order Department persons at any distance can purchase goods as favorably as over the counter. All orders, whether large or small, receive prompt and careful attention. Satisfaction guaranteed. Samples mailed, and any information cheerfully given.

411, 413, 415 and 417 Broadway, - Milwaukee, Wis.

☞ Mention "Farmers' Institute Bulletin" when writing to Advertisers.

BELLE CITY
ENSILAGE AND FODDER CUTTERS



THE BELLE CITY MANUFACTURING COMPANY

Have sold over 15,000 of these Cutters the past season, which is the best recommend that can be offered regarding them. They are now used at most of the State Farms, also at the Government Experimental Stations. The above cut shows the self feeding attachment which they are putting on most of the larger sizes, and which is becoming so popular among the stockmen and ensilage feeders. These are the lightest running machines on the market, and have the greatest capacity of any machine now known and are all guaranteed to run at great speed with perfect safety. The capacity of these cutters is almost unlimited, taking fodder of all kinds more rapidly than operators can get it to the machine. The Belle City Cutters are made in twelve different sizes for both power and hand use, and most of the power machines can be easily turned by hand. Carriers of any length can be attached to these machines and run at any angle. The knives of the very best cast-steel, which this company are now importing direct from Sheffield, England, is used for these cutters. **Send for Illustrated Catalogue and Price List.** ADDRESS

BELLE CITY MANUFACTURING CO.

Racine, Wis.

See opposite page.

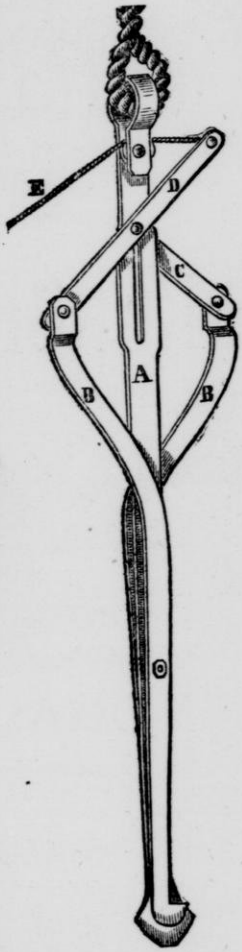
TRADE MARK.

BELLE CITY
MANUF'G CO.,
RACINE, WIS.

OUR RED JACKET
Horse Hay Fork.

It is Strong, Durable, Simple, and a perfect working fork; is made of SPRING STEEL, and therefore will not break. It is so constructed that there is nothing to prevent it from going over beams or through pitch holes; does not catch or tear itself to pieces.

It is very light (weighs only 10 pounds), and therefore easily pulled back to the load. It is easily tripped or unloaded, takes up ALL KINDS OF HAY, and for Clover and Short Hay, it



SURPASSES ANY FORK KNOWN.

And having a Cutting Edge Point, it enters the Hay easily, even when damp. A boy ten years old can operate it. All things considered, it is the very best Horse Hay Fork in use.

AGENTS WANTED IN EVERY COUNTY.

PRICE, $4.00.

MANUFACTURERS OF THE FAMOUS

BELLE CITY FODDER CUTTERS,

Horse Powers (both tread and sweep), Horse Hay Forks, Root Cutters, Barrel Carts, Cultivators, Harrows, and other implements.

Send for Illustrated Catalogue. A free book on Ensilage will be sent to any one, upon their application for the same.

SEE OPPOSITE PAGE.

PRAIRIE VIEW

Percheron Horse-Breeding Farm.

COME AND SEE THE

CHOICEST AND CHEAPEST

LOT OF

Young Stallions and Mares

Ever imported from France, and recorded in the Percheron Stud Books of France and America. These Stallions and Mares are

FOR SALE AT A BARGAIN.

As I do my own buying in person, and am well acquainted in the Percheron horse district, with nearly all the leading breeders and dealers, I can buy as cheap as the cheapest, and can sell as cheap, breeding, quality, and style of horses considered.

Send for catalogue, and come and examine the stock.

I also have a choice lot of grade Mares and Fillies that I will sell at a bargain.

H. A. BRIGGS, Elkhorn, Walworth Co., Wis.

BUY NORTHERN GROWN SEED.

Grass is king! The total value of grass crops exceeds that of any two other farm products! Tremendous stock of *Grass and Clover Seeds.* It will pay you to get our list and try our seed! Wholesale list for large buyers. **SALZER'S EXTRA GRASS MIXTURE for Meadows and Pastures on Rich, Dry Soil,** per lb. $2.00; per 100 lbs. $13.00; per 1,000 lbs. $110.00.

Sow from 20 to 30 pounds per acre of these mixtures.

See my catalogue, and read what it says about these grass mixtures.

Headquarters for

ENSILAGE CORN,

New Oats, Wheat, etc., etc.

VEGETABLES.

In addition to the enormous stock of all kinds of farm seeds, we make a specialty of

EARLY AND CHOICE VEGETABLE AND FLOWER SEEDS.

It will pay you to get one of our Catalogues before buying.

JOHN A. SALZER,

See also pages 279, 296, 311, 319.

La Crosse, Wis.

"The North Western Line"

→IS THE←

GREAT SHORT LINE

Between Principal Points as Shown on Map.

Solid Trains, or through Sleeping Car Service is as follows:

SOLID VESTIBULED TRAINS between
Minneapolis, St. Paul and Chicago.

PULLMAN PALACE SLEEPING CARS between
St. Paul, Minneapolis and Kansas City,
via Sioux City and Council Bluffs.

PULLMAN PALACE SLEEPING CARS between
Duluth, Superior, Chippewa Falls and Chicago.

PULLMAN PALACE SLEEPING CARS between
Minneapolis, St. Paul and Duluth,
and St. Paul and Ashland.

Also **PARLOR CARS ON DAY TRAINS** between
Minneapolis and St. Paul and Ashland.

THE MOTTO OF THE NORTHWESTERN LINE IS

"ALWAYS ON TIME."

For rates or any desired information, address

E. W. WINTER, General Manager.
F. B. CLARKE, Gen'l Traffic Manager.
T. W. TEASDALE, Gen'l Pass. Agt., ST. PAUL.

☞ Mention "Farmers' Institute Bulletin" when writing to Advertisers.

DAIRY SALT

A SPECIALTY.

PURITY

STRENGTH

Our Dairy Salt is made by our PATENT VACUUM PAN PROCESS, being the only Dairy Salt in the world made by that process. The Pure Brine is put into the Vacuum Pan, shown in the above cut, and is grained under a Vacuum entirely by heat. No chemicals, butter, or any other grease is used to purify, bleach or grain it. By examination with a powerful magnifying glass, it will be found that all grains or crystals are transparent and of the same shape and size, and the shape will be found to be an absolute cube. This salt is guaranteed not to cake or harden as other salt does. For

BUTTER, CHEESE and MEATS

It has no equal, and we especially invite tests with any other salt in the world to satisfy parties as to the truth of our statements. For salting **Butter, Cheese or Meats** we guarantee this salt to be

EQUALLY AS GOOD, IF NOT BETTER,

THAN ANY FOREIGN SALT.

Our agent, **R. M. BOYD, of Racine, Wis.**, will promptly answer all inquiries in regard to it, or call on parties who wish to purchase.

We Solicit Correspondence.

This Salt is put up as follows: For Dairy Purposes, in barrels holding 280 lbs., and in 28, 56, 112 and 224-lb. sacks. For table and other purposes, 140-2, 100-3, 60-5, 28-10 and 20-14 lb. packets, filled and packed in barrels.

BUTTERS & PETERS, SALT AND LUMBER CO.,

LUDINGTON, MICHIGAN.

M. W. DUNHAM'S

OAKLAWN ✣ FARM.

1868.

BRILLIANT 1271 (755).

1888.

3,000 PERCHERON

—:AND:—

FRENCH COACH HORSES,

IMPORTED.

STOCK ON HAND:

300 STALLIONS of servicable age; **150 COLTS** with choice pedigrees, superior individuals; **200 IMPORTED BROOD MARES** (80 in foal by Brilliant, the most famous living sire).

Best Quality. Prices Reasonable. Terms Easy.

DON'T BUY WITHOUT INSPECTING THIS

Greatest and Most Successful Breeding Establishment of America.

Intending purchasers, address, for 250-page catalogue,

M. W. DUNHAM,

WAYNE, ILLINOIS.

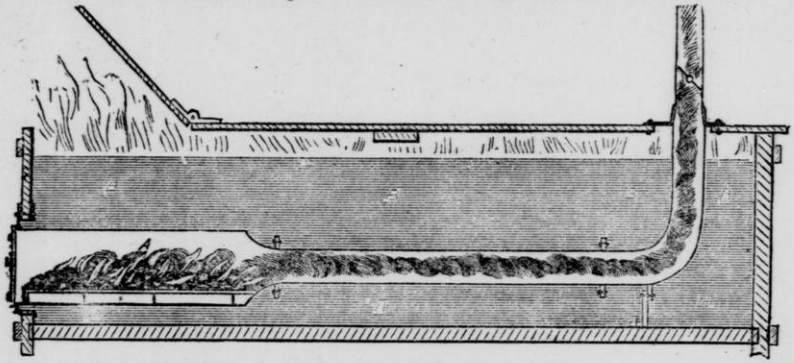
85 miles west of Chicago, on C. & N. W. R'y, bet. Turner Junction and Elgin.

☞ *Mention "Farmers' Institute Bulletin" when writing to Advertisesr.*

STOWELL'S

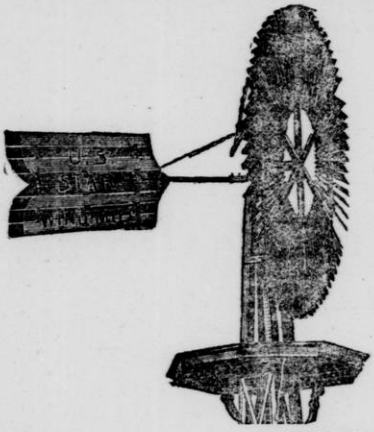
Removable Stock Tank Water Heater.

Used and Endorsed by the Leading Dairyman of the Country.



A well-known Dairyman warmed the water for 25 cows. No variation was made in the kind or amount of food, yet the flow of milk increased twenty quarts per day, and the higher yield continued. Thus, **SIMPLY WARMING THE WATER** was equivalent to enough food to produce twenty quarts of milk a day, which at the rate milk was sold—5 cents per quart—was equal to $7 per week for 25 cows, or about $300.00 per year, while the results with fattening and stock cattle are even more satisfactory than with dairy cows.

This Heater will take 50 per cent. less fuel to warm the water than any other Heater in the market. The furnace being longer, fire can be built farther back from the door, consequently less danger of fire. It can also be removed during summer, when not in use. Testimonials of thousands of farmers throughout the northwest pronounce it the best Heater made. All Heaters warranted to do as represented. They are built of cast iron, proper shape and thickness, and warranted not to crack or break, as other cast iroh Heaters do.



The "U. S. STAR,"

BEST MILL IN THE MARKET.

Best regulated solid wheel, as well as best made mill ever offered to the public.

—MANUFACTURE—

SILO, STOCK AND RESERVOIR TANKS,

COOLEY

Combination Creamery Tanks.

Tanks of all sizes made to order with Heaters adjusted, shipped knock down, in good shape for putting together.

Good Reliable Agents Wanted in all Unassigned Territory.

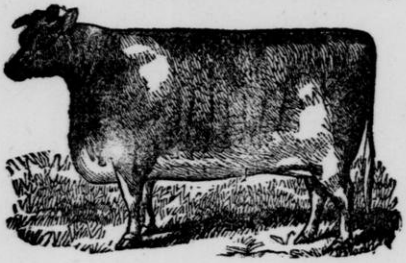
ADDRESS ALL ORDERS TO

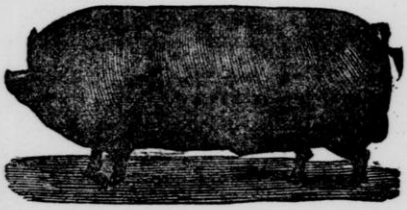
O. G. STOWELL,

DELAVAN, WIS.

ALEX. A. ARNOLD,

Eastville Farm, Galesville, Wis.,





BREEDER OF

SHORT-HORN CATTLE

—: AND :—

BERKSHIRE HOGS.

RECORDED CATTLE

—: AND :—

REGISTERED HOGS

OF ALL AGES AND SEX, CONSTANTLY ON HAND.

Stock Kept Constantly Thriving,

BUT NEVER PAMPERED.

MILKING QUALITIES MADE A SPECIALTY

In Breeding Short-horns.

The Short-horn is standard for beauty and utility and the most valuable breed for the average farmer.

The Berkshire is also the standard hog, it furnishing, when ready for market, the best pork of all breeds, for the reason that the skin is thin, the bones firm and comparatively small, with more muscle or lean meat than any other breed. They mature early, are good mothers, prolific breeders, and when crossed on the large breeds produce best results.

COME AND SEE THE STOCK.

Correspondence Solicited.

A. A. ARNOLD,
GALESVILLE, WIS.

STANDS for LOUISVILLE & NASHVILLE, the greatest railroad system in the South, almost covering the states of Kentucky, Tennessee and Alabama, and reaching out into and through Florida, Mississippi and Louisiana. With its northern terminals at St. Louis, Evansville, Louisville and Cincinnati, its line passes through Nashville, Decatur, Birmingham, Montgomery, Mobile and Pensacola, with extreme southern terminals at New Orleans on the west and Chattahoochee on the east. Terminals of other divisions are Memphis, Jellico (on the line to Knoxville), Florence, Sheffield, Bessemer, Ala., Lexington, Ky., and numerous other smaller places.

Double daily trains, both north and south, are run the entire length of the line, with three and even four trains in each direction on some portions of it. This for through business. For local business, trains are run to accommodate the residents of each section, affording ample facilities between the villages and cities.

The possibilities of the South for agricultural pursuits have not yet been fully developed, even sufficiently to point out examples, as the greatest portion of the farming country is still held in too large tracts for successful cultivation. This is, however, being gradually overcome, and with the influx of those who have become tired of living in a country where it is "eight months winter and four months late fall," bringing with them the energy and capability which is a necessity for existence in their cold climate, better results may be expected. But a small portion of the work necessary to secure a living in the North, if expended on a Southern farm, would assure such results as would astonish the average Northern farmer.

The Louisville & Nashville R. R. has no lands of its own for sale; but there are along its lines hundreds of large plantations, the owners of which are willing to divide into smaller tracts. These lands are held for sale by real estate agents and others, and can be bought at reasonable figures.

Send for a copy of "Southland," free, a monthly paper devoted to the agricultural interests of the South.

When you are going to any part of the South, ask for tickets reading over the Louisville & Nashville Railroad.

C. P. ATMORE, Gen'l Pass. Agt., Louisville, Ky.

GEO. L. CROSS, N. W. Pass. Agt., 232 Clark St., Chicago, Ill.

THE '76 HERD

—OF—

Short-Horn Cattle,

—PROPERTY OF—

W. H. Jacobs, - Madison, Wis.

I have now the largest herd of Registered Short-horn Cattle owned and kept in the state, consisting of

Kirklevingtons, Princess, Fennell Duchess, Blooms, Louans,
J. Princess Fletchers, Arabellas,

And other good milking and great beef producing families. My herd has won more prizes in the last two years than any herd in the state, having won

22 First, 14 Second and 10 Sweepstake Prizes This Year.

I have quite a number of young bulls and heifers sired by the great sire Cherry Duke of Ridgewood 85093, and also a number of cows and heifers in calf to the high bred Bates bull

KIRKLEVINGTON DUKE 23d,

87446,

Which I will sell at the lowest kind of prices, breeding and quality considered. I have lately sold 5 head from my herd to parties from Buenos Ayres, South America, after they had visited herds in a number of different states.

Correspondence Solicited and Promptly Answered

—BY ADDRESSING—

W. H. JACOBS, MADISON, WIS.,

Or cattle will be willingly shown to visitors by calling on

P. WAKEM, Manager, at Burke Station,

Five miles from Madison on Watertown Branch of C., M. & St. P. R. R.

Terms Made Very Easy to Responsible Parties Wanting Time.

OBJECT LESSONS IN PRACTICAL HUSBANDRY.

The above illustration, reproduced from photograph, shows Mr. Geo. A. Austin in his field of Ensilage corn, raised from "B. & W." seed furnished by Cornish, Curtis & Greene, of Fort Atkinson, Wisconsin, general western agents. Write for circulars.

The average yield of twenty acres, after wilting and curing from two to ten days, was 19 23-100 tons per acre, and the cost of plowing, planting seed, cultivating, cutting and putting into silo was at the rate of $12.27 per acre, or less than 64 cents per ton.

Be Sure and Get the Genuine B. & W. Take no Other—10,000 bu. sold last year.

CORNISH, CURTIS & GREENE, Fort Atkinson, Wisconsin,

Manufacturers and dealers in everything pertaining to Butter and Cheese Making. Send for Prices and **Discounts.**

The Ertel VICTOR

AUTOMATIC FOLDER,

Double-Acting Perpetual Hay and Straw Press.

FULLY PROTECTED BY 48 PAT. CLAIMS.

Is the Most Scientifically Arranged and Improved Baling Machine Ever Produced

A MACHINE IMITATED BUT NOT EQUALLED.

CAPACITY ONE TO TWO TONS PER HOUR.

The Victor being double-acting and continuous in its operation, a charge of hay placed in it and pressed up at each turn of the horse or team, and having a larger feed hole than any other, hence

GREATEST IN SPEED.

It being provided with a folder automatically overlapping and folding down each charge of hay, thereby dispensing with all doors and attachments commonly used in other presses, besides saving much time and hard labor in feeding it.

AUTOMATIC DOUBLE PLUNGER BRAKE.

Is provided with an automatic yielding double-brake lever, firmly receiving and holding plunger in rearward position, preventing striking and jarring of press or team.

AUTOMATIC TENSION REGULATOR.

With the automatic tension self-regulator used on our Victors we avoid the constant care and labor of having continually to regulate the tension by hand, as done by others; needs but little adjustment, and has only to be seen and tried to be appreciated.

PRESS BOX LINED WITH IRON OR STEEL.

The press box in each Victor is lined on all sides with iron or steel, not only reducing draft of power, but also prolonging the life of the machine, and without having to pay from $25.00 to $40.00 extra for it as charged by others.

WARRANTY

Of being the most complete **Hay and Straw Press manufactured.** Warranted by us as being the strongest built baler; baling Hay or Straw more rapidly, *nicer and easier*, and doing the work more economically than can be done with any other Horse Power Press manufactured and sold in America; and further will say that we will operate the Victor against any other portable horse-power baling press in the market, on condition of, *first*, setting and moving, *second*, amount of baling, *third*, smoothness and solidity of bales, *fourth*, economy and ease of operation.

We Invite Competition, Excepting No One, Whatever Name or Style it May Be.

Illustrated large circulars, giving full information with prices of the different Ertel Baling Presses, mailed free. Address,

GEO. ERTEL & CO., Manufacturers,

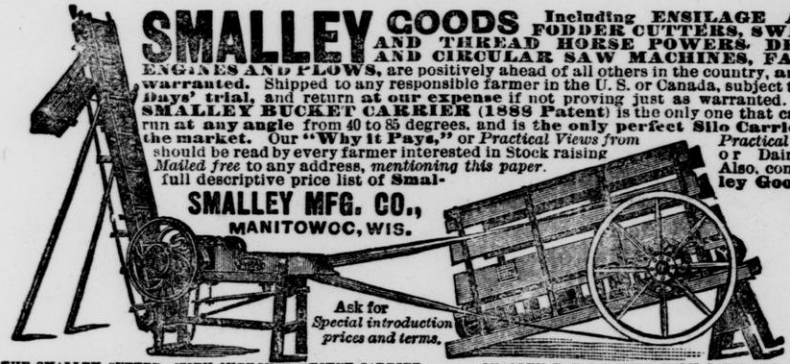
Established 1867. **QUINCY, ILL., U. S. A.**

Money on the Farm.

DOUBLE YOUR STOCK.

Smalley's Ensilage Cutters

STILL TAKE THE LEAD.



THE SMALLEY CUTTER, WITH IMPROVED BUCKET CARRIER. SMALLEY TREAD POWER WITH GOVERNOR.

Appleton Mfg. Co., 19-21 S. Canal St., Chicago—GEN'L AGENTS—Fuller & Johnston Mfg. Co., Madison, Wis.

SEND FOR OUR 1888 BOOK

WHY IT PAYS.

Ensilage and Fodder Cutting.

Practical views by such men as Hiram Smith, A. A. Arnold, F. C. Curtis, and D. F. Sayre & Sons.

See Next Page.

The Smalley Manufacturing Co.,

MANITOWOC, WIS.

Smalley Ensilage Cutters

STILL AHEAD.

Never Feeds any Uncut Fodder.

SHEBOYGAN FALLS, SHEBOYGAN CO., WIS., March 13, 1888.

SMALLEY MANUFACTURING CO.

Gentlemen:—I built a Silo in the summer of 1886, size forty by twenty-eight, and sixteen feet high, divided into three pits, capacity 270 tons, cost about $400; stands on stone foundation, the walls made of matched flooring and tar board paper. The building is used for grain barn, and threshing is done just before the corn is sufficiently matured for Ensilage, say large enough to make roasting ears, cost of cutting corn in field and cutting into Silo about fifty cents per ton. My success has been entirely satisfactory, and I shall build an addition this year with capacity of 125 tons more; it is the cheapest cow feed I ever raised. I feed one feed a day of dry corn fodder and barley straw mixed, run the dry fodder through the cutter, and on eight pounds of dry feed put four pounds of wheat middlings. Never feed uncut fodder. I have for the past two years used a No. 14 Cutter and twenty-four foot Carrier, manufactured by the Smalley Manufacturing Company, of Manitowoc, Wis., and like it very well. Yours truly,

HIRAM SMITH.

Ex-President Arnold tells his Experience with Ensilage and Cutters.

GALESVILLE, TREMPEALEAU CO., WIS., March 12, 1888.

SMALLEY MANUFACTURING CO.

Gentlemen:—I built a Silo in 1887 in my barn; it is twelve by twenty-four, and twenty-eight feet deep, eight feet in the basement, and cost $130; holds 125 tons, and cost about $1 per ton for cutting and filling. Corn partly cured the best, corn well matured the best. When heated to 120 degrees, Ensilage is sweet and better than when filled too fast and not allowed to heat up. I consider a ration of from twenty to twenty-three pounds, twice a day, with dry fodder, the best ration in cold weather for the health of the cattle and the quality of the milk and butter. Fully matured corn from the field makes a good ration for fattening steers. I do not cut dry fodder at all. I use a Smalley No. 12 Cutter, and cut one ton in from fifteen to twenty minutes, one-half inch long, with an elevator. The elevator is like most of the machines, but I think it should be improved by use of rubber belts instead of chain.

ALEX. A. ARNOLD,
Ex-President Wisconsin State Agricultural Society.

Never Done Better at Butter-Making.

ROCKY RUN, COLUMBIA CO., WIS., March 10, 1888.

SMALLEY MANUFACTURING CO.

Gentlemen:—Having a large stone barn I used a part of it for a Silo, and to give cost of same would be no criterion, having used it two seasons. I was the butt of ridicule the first season, but it proved so valuable that four of these ridiculing neighbors built Silos the last season, and all are pleased with the result. Six men and six horses, with two wagon trucks, a Smalley Four-horse power and Smalley No. 12 Cutter, put in about twenty tons a day. We used their Carriers, too, all of which worked complete. I have fed forty-five head of cattle on Ensilage once a day, and good straw twice a day, with about eight quarts of wheat mixed with bran, oats and corn meal, each with warmed water. The stock so fed looks better than it has for two years, and the cows never done better at butter-making. Shall increase my Silo capacity the coming season. F. C. CURTIS.

The Smalley Manufacturing Company, Manitowoc, Wis.

WOODSIDE
Stock Farm,

Oregon, Dane Co., Wis.

LARGE, STYLISH

Trotting Bred Carriage Horses,

PURE BRED AND HIGH GRADE

SHORT-HORN CATTLE,

Berkshire and Poland China Swine.

At the head of the horses stand the two Richly Bred Stallions,

WILCAN, NO. 6765, AND ALMADA, NO. 6766.

They are large and coachy, standing 16 hands and weighing respectively 1300 lbs. and 1240 lbs. They are rich bay in color. They have the finest of style, superb carriage action and slashing road gaits, and their fine breeding gives them a right to trot fast if trained.

FIFTY OF THEIR COLTS UPON THE FARM

Afford interested parties a grand opportunity to see their value in the stud as getters of large, handsome, useful colts of very uniform bay color.

THE SHORT-HORNS

Are of the blocky, short-legged sort. Form and ability to suckle two good calves without extra feed is our criterion; pedigree next. At the head of our herd stands De Graff's Surmise, by imported Baron Surmise, 1st dam by 4th Baron Oxford, 2d dam by 38th Duke of Oxford.

Cattle and Horses, all Ages and Sexes,

For Sale at All Times of the Year, at Bed Rock Prices to Suit the Times.

EXTRA FINE COLTS, at Weaning Time, $100
CHOICE HIGH GRADE CALVES, at Weaning Time, $30 to $40.
PURE BRED CALVES, at Weaning Time, $40 to $50.

☞Boar Pigs in Season. Gentle Family Horses a Specialty. Catalogues on Application.

A. O. FOX, Oregon, Dane Co., Wisconsin.

BUY NORTHERN GROWN SEEDS.

Thousands of Wisconsin farmers have the past years bought their seed of us to their entire satisfaction and profit. And now, while hundreds of wide awake tillers of the soil are building silos, they naturally will need an A. No. 1 corn, or other Rich Fodder Plants, to fill them with. Now the fact of the matter is, our Fodder and Farm Seed Department is by all odds the most complete in America. All Seedsmen recognize this, for many copy it almost to a letter, imitate our descriptions, illustrations, etc., etc.; but they never can fill an order with our **WARRANTED SEEDS,** grown in the extreme North, some of it on our Dakota farms over 800 miles north of here. Now while you are looking for **GOOD SEEDS,** why not buy **THE BEST,** and get them direct from us as growers? Some Seedsmen will tell you because they live in a **BIG CITY** like Milwaukee or Chicago, they are in just as good shape to sell you Farm Seeds cheap as we are. Yes, they can go to the elevators and buy up wheat, barley, oats and corn cheap, but do you want that for seed? Is it not better to buy direct from us as growers? Think the matter over and in the meanwhile get our catalogue and prices, also our wholesale Grass List for farmers. Our 1888 catalogue is fine, but our catalogue for 1889 will be still more complete. It will be ready for mailing January 1, 1889. Our catalogue for 1888, can be had now.

SALZER'S FODDER CORN.

The demand for Ensilage corn is of late years simply enormous. For this purpose a rapidly growing, **Early** short jointed, tall corn, with a great abundance of leaves and tender stalks, rich, juicy, sweet flesh in the stalk and a tendency to mature several ears is desirable, as a corn of this nature furnishes more tons of green fodder per acre and almost double the nourishment than the common corn used for this purpose. Corn for fodder or ensilage purposes can be sown either broadcast or in drills. **Salzer's Fodder Corn** we believe answers fully all points and requirements for a good fodder corn. Cropping as high as 50 tons of fodder per acre. Very early. In my trial grounds it is a sight worth seeing; nothing goes ahead of it, or looks so luxuriant and rich as Salzer's Fodder Corn. *It is ahead of the celebrated B. and W.*, and all other Fodder Corn sorts, and we heartily recommend it to the Farmers of Wisconsin. Catalogue free.

JOHN A. SALZER. La Crosse, Wis.

☞ *Mention "Farmers' Institute Bulletin" when writing to Advertisers.*

Red Polled Cattle

THE BEST OF ALL.

"PAULINA," E 11.310.

WM. STEELE AND MARTIN BROS.,

IMPORTERS AND BREEDERS OF

Red Polled Cattle.

We have on hand and for sale a few

CHOICE BULLS AND HEIFERS

OF SUPERIOR MERIT. CORRESPONDENCE SOLICITED.

WILLIAM STEELE,
MERTON,
WAUKESHA CO., WISCONSIN.

OR,

MARTIN BROS.,
RICHLAND CITY,
RICHLAND CO., WISCONSIN.

SALZER'S SPLENDID FARM SEEDS.

We grow and carry in stock larger quantities of Farm Seeds than all western seedsmen combined, and hence can always supply you and at the same time save you money. We hope you will send for our catalogue and see the large array of New Wheat, Oats, Barley, Buckwheat, Corn, Flax, Rye, Potatoes, etc., etc., that we have to offer. It will pay you in more ways than one. It is always well to change your seed grains—it pays.

GRASS AND CLOVER.

You say the hay crop was enormous this year. That's so; but will it be so next year? The way to have a big, heavy crop, even larger than in 1888, is to sow

SALZER'S

EXTA GRASS MIXTURE.

Just think of cutting

THREE ROUSING CROPS A YEAR

The way to do it is to plant Salzer's Seeds.

CATALOGUE FREE!

Wholesale Grass List Free.

John A. Salzer,

La Crosse, Wis.

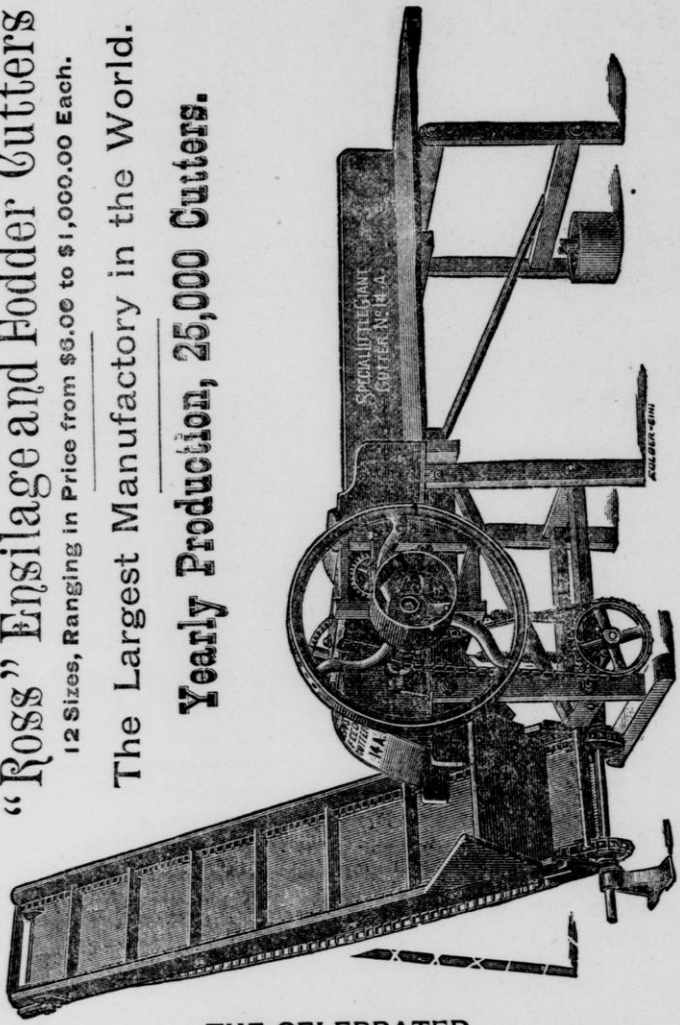
See advertisements on pages 279, 287, 296, 311.

"Ross" Ensilage and Fodder Cutters

12 Sizes, Ranging in Price from $6.00 to $1,000.00 Each.

The Largest Manufactory in the World.

Yearly Production, 25,000 Cutters.



THE CELEBRATED

"Ross" Ensilage and Fodder Cutters

CARRIERS AND POWERS,

MANUFACTURED BY

E. M. ROSS & CO., SPRINGFIELD, OHIO, U. S. A.

Send for our 80 page Illustrated Catalogue, and 10 cents in stamps for our 160 page book of Practical Information on ENSILAGE, and BUILDING OF SILOS.

☞ Mention "Farmers' Institute Bulletin" when writing to Advertisers.

PLEASE READ

What a few of our friends say who use

Ross Cutters, Carriers and Tread Powers.

ALLENTOWN, WIS., April 17, 1888.

MESSRS. E. W. Ross & Co., Springfield, Ohio.

Dear Sirs:—The No. 11 A Cutter I bought of your agent at Hartford, Wis., gives the best of satisfaction to me and all who have seen me cut dry fodder, as well as short hay, and very short and chaffy straw and corn stalks. I can do as much work with two horses as any of my neighbors can with four. It runs easily, and it is easy to feed it all day, which cannot be said of some others.

Yours truly, MATH. BATH.

WAUMANDEE, WIS., April 2, 1888.

MESSRS. E. W. Ross & Co.:

Gentlemen:—Yours of the 23th of March received, but I can not give very satisfactory answer to your questions, because I got the Cutter only just before New Year's. I used it for cutting dry corn stalks. It saved me at least one-half the feed, and my cattle kept as well as on good hay, and ate it all up with no waste.

JOHN OSCHNER.

BRODHEAD, WIS., April 9, 1888.

MESSRS. E. W. Ross & Co., Springfield, Ohio.

Gentlemen:—Your letter received, and in reply will say:· Last fall I bought one of your No. 14 A Cutters, and used it to fill my silo, 14x24x20 feet, and to cut corn stalks to feed my cattle once a day all winter, and have had no breaks or trouble with it or the Carrier. I am perfectly well pleased with it; also with silo and ensilage. Your very truly,

N. N. PALMER.

ARCADIA, WIS., April 30, 1888

MESSRS. E. W. Ross & Co.

Gentlemen:—In December, 1886, I purchased a No. 14 A Ross Cutter of your agent here, J. C. Muir, and have used it the past two winters to cut feed for about 100 head of stock, and am well satisfied with the work. It is strong and durable, and not liable to get out of order. Have cut corn fodder, straw and hay, and it worked satisfactorily with all. It has not cost me one cent for repairs, and it has saved me three or four times its price. On account of the scarcity of feed the past two winters. farmers in this vicinity are just beginning to wake up to the advantages of cutting feed. There have been twenty-five or thirty Ross Cutters sold here during the past fall and winter, and I am sure sales will increase. Yours truly,

M. J. CASHEL.

AURORA STATION, OHIO, Oct. 15, 1888.

E. W. Ross & Co., Springfield, Ohio.

This fall I used a Ross No. 14 A Ensilage Cutter and 18 foot Carrier in filling my silo. The power used was a ten horse power engine. The cutter performed all that could be asked of one of its size. We cut with it, without hurry, about four full two-horse loads of fodder per hour, and it on the Carrier never "skipped a stitch." The corn was very heavy, fully twenty-eight full two-horse loads per acre, heavily freighted with grain, which was a good trial of its capability. One big load was run through in eight minutes, and was not aware that the watch was being held upon us at the time. We are entirely satisfied with the machine. You can refer to us at any time.

Yours respectfully, JOHN GOULD.

PITTSFIELD, MASS., April 9, 1888.

MESSRS. E. W. Ross & Co., Springfield, Ohio.

Gentlemen:—We use a No. 14 A Ross Cutter for cutting our fodder corn. We grow fodder corn largely and cure it. I would not know how to get along without a Ross Cutter. It works like a charm. We cut for over 70 head, running it with one horse power, and do not require more than an hour and a half a day. Very truly yours,

E. E. MORRIS, Sup't Wahconah Farm.

DAYTON, OHIO, April 12, 1888.

MESSRS. E. W. Ross & Co., Springfield, Ohio.

Gentlemen:—I have used the No. 11 A Ross Cutter one season and it has given me entire satisfaction. It will do all that is claimed for it. I recommend it to any one wanting a first-class Cutter.

Yours respectfully, ISRAEL DENLINGER.

WESTFIELD, VT., April 9, 1888.

MESSRS. E. W. Ross & Co., Springfield, Ohio.

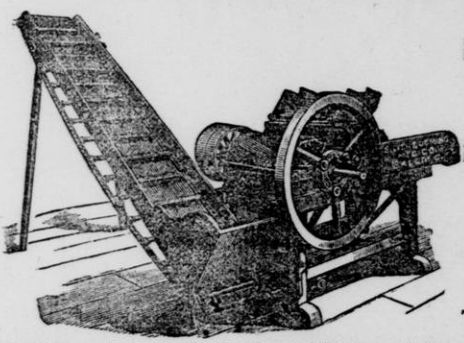
Gentlemen:—I bought one of your No. 13 A Power Cutters of D. L. Fuller & Son, and am well pleased with it. I don't see how it could be better. I have used it to cut green and dry fodder with perfect satisfaction, and can recommend it to any one wanting a Cutter.

Yours truly, O. C. WILDER.

THE FAMOUS OHIO

Ensilage and Feed Cutters

ARE THE BEST.



The above cut represents Ohio Special Ensilage Cutters Nos. 20 and 24, with Right Delivery Angle Carrier.

Our Cutters have

More Points of Convenience

—ARE—

EASIER TO OPERATE,

Less Liable to Breakages and Accidents,

—AND—

Will do More Work,

size and price considered,

Than any other make of Cutters on the Market.

OUR SOLID KNIFE HEADS

With Adjustable Knives.

OUR SAFETY FLY-WHEEL,

AND LEVER TO STOP FEED ROLLERS,

(And change lengths of cut) are features which place our machines ahead of all competitors.

OUR CATALOGUE, CONTAINING A

Treatise on Silos and Ensilage,

With PLAN and SPECIFICATIONS for building a 100-ton Silo, will be sent free to dealers and stock-raisers on application.

SILVER & DEMING MANUF'G CO.,

SALEM, OHIO.

HENION & HUBBELL, General Western Agents,

55 and 57 North Clinton Street, Chicago, Ill.

N. B.—A few testimonials from stockmen using our cutters are given on next page.

LETTERS OF RECOMMENDATION,

RECEIVED FROM PEOPLE USING

The Ohio Ensilage and Feed Cutters.

Morganza, Pa., March 26, 1887.

Silver & Deming Mfg. Co., Salem, Ohio.

GENTLEMEN:—Replying to yours of the 16th instant, the Ensilage Cutter purchased of you last fall has given entire satisfaction. With it we are able to cut sufficient Ensilage to fill our Silo of about 200 tons capacity in three days. We have fed some fifty head of cattle on Ensilage this winter, to the exclusion of hay, and our cattle never came through the winter in as good condition.

Yours truly,
J. A. QUAY, Supt. Pa. Reform School.

La Fayette, Ind., May 6, 1887.

Silver & Deming Mfg. Co., Salem, Ohio.

DEAR SIRS:—The Ensilage Cutter has given me perfect satisfaction. It was operated by steam power and did the work of cutting and elevating to perfection. It is simple in its mechanism, and is so strongly built that I anticipate little trouble in keeping it in repair. I cannot commend it too highly. With it I cut and elevated (24) twenty-four feet, a ton of green fodder in (5¾) five and three-fourths minutes.

Respectfully yours,
JOHN W. HEATH,
President La Fayette National Bank.

Waupun, Wis., May 30, 1887.

Lindsay Bros., Milwaukee, Wis.

DEAR SIRS:—You must excuse me for not answering your letter before this in regard to the Silver & Deming Cutter. The Silver & Deming Cutter is a first-class machine and does its work up in good shape. We should have run over 100 tons of hay short if we had not had that Cutter last winter. We cut over 100 acres of corn stalks. That Cutter will cut all one man is able to feed. I have a table, same as threshing machine, attached to the Cutter, one man pitching stalks, one putting them on the table, and one feeding; in an hour I can cut stalks enough to feed 250 to 300 head of cattle a meal, and we feed a bushel basket full to each head. We did not cut anything but corn stalks of any account, but am satisfied that the machine will cut as much of any kind of hay or straw as can be well got to and from it. I have seen different kinds of Cutters at work, but do like the Silver & Deming the best of them all.

Yours respectfully,
W. F. HAKER, Farmer and Stock-Raiser.

Jackson, Mich., July 23, 1886.

Silver & Deming Mfg. Co., Salem, Ohio.

GENTLEMEN:—Replying to yours about capacity of Cutter purchased from you, we took careful note of same because intending to buy another Cutter for another place. Knowing the difference between dry and green corn stalks, and basing statements on work actually performed, we will say we can pass ensilage corn through the Cutter on a one-half inch cut with ordinary farm help and ordinary facilities for handling, at the rate of six tons per hour. This is one ton every ten minutes, and is about as fast as product can conveniently be handled to and from Cutter. We, however, arrange things conveniently and passed one ton through in six minutes, or at the rate of ten tons per hour. This makes livelier work than men are usually accustomed to, but, everything being favorable, it can be done.

Respectfully,
A. & H. WILCOX, Merchants and Stock-Raisers.

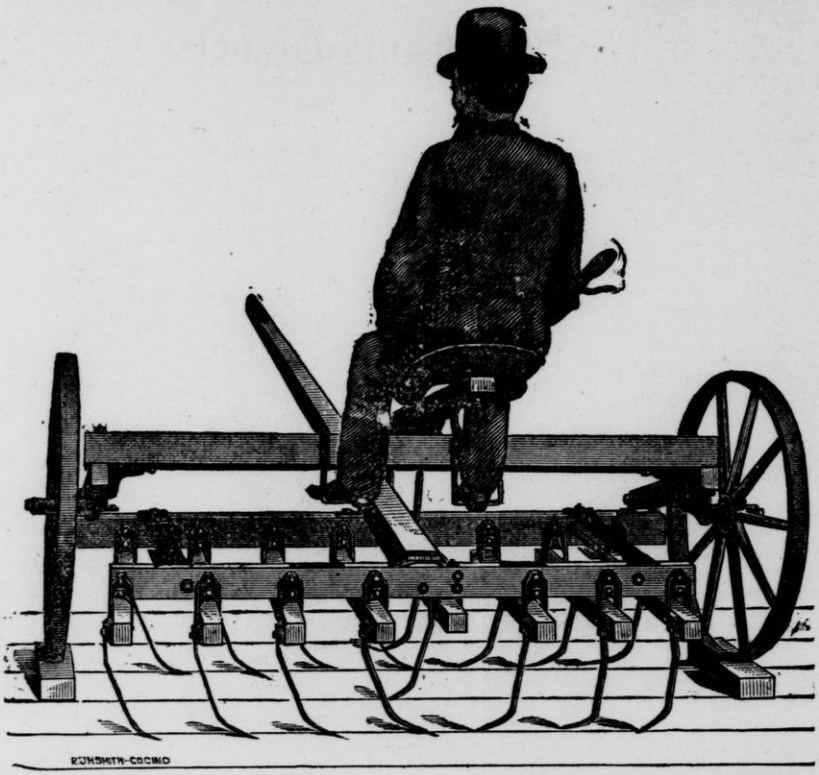
Salem, Ohio, July 16, 1886.

Silver & Deming Mfg. Co.

GENTLEMEN:—Having used your large Ensilage Cutter for two seasons, not only on green, but dry fodder, testing it sometimes with as much as 60 to 100 tons per day, I have no hesitation in recommending it to all who wish to preserve crops in the Silo, or utilize green or dry fodder in the most effective and economical manner in the modern siloing system. Its capacity for cutting seems to be without limit, and the strenght of the parts of which it is composed is a guarantee against breakage.

Respectfully,
J. T. BROOKS, General Counsel Pennsylvania Company.

THE BOSS PULVERIZER.



The Boss Harrow Mfg. Co.: MILTON, WIS., JUNE 21, 1888.

DEAR SIRS:—I was using a new Keystone Disc Harrow, as I did not know of any better one; but hearing of yours, I thought I would give it a fair trial in some field beside the New Keystone Disc and satisfy myself which done best work. Was so well pleased with work done by The Boss Pulverizer that I sold the Disc for what I could get ($19.00).

Very truly yours, THOS. DRIVER.

The Boss Harrow Mfg. Co.: BLOOMING GROVE, WIS., JUNE 27, 1888.

GENTS:—The Boss Pulverizer I bought of you last spring suits me to perfection. It does its work thoroughly; it is capable of fitting a piece of fall plowing as neat as a garden bed; it leaves no ridges; all the ground is pulverized equally. I have used the Disc Harrow for four years, and using the Disc and the Boss side by side I must say the Disc is no comparison to the Boss.

Yours truly, JOHN SPRECHER.

The Boss Harrow Mfg. Co.: MILTON, WIS., JULY 16, 1888.

DEAR SIRS:—Yours 7th to hand on yesterday. In reply would say I have a new Acme Harrow and think so little of it I never intend to hitch to it again. I would say that there is *no* comparison in the working of machines or work done by them. I *know* The Boss Pulverizer is *ahead of anything.* I pulverized 35 acres 5 inches deep in 3 days, or 30 hours.

Yours truly, THOS. DRIVER.

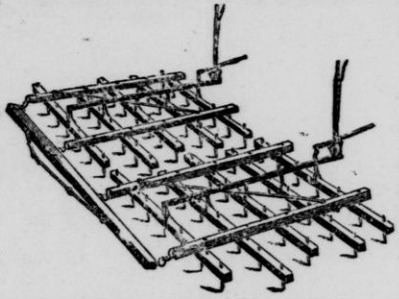
Seeing is Believing. Try One and Be Convinced. Made by

THE BOSS HARROW M'F'G CO., MADISON, WIS.

☞ Mention "Farmers' Institute Bulletin" when writing to Advertisers.

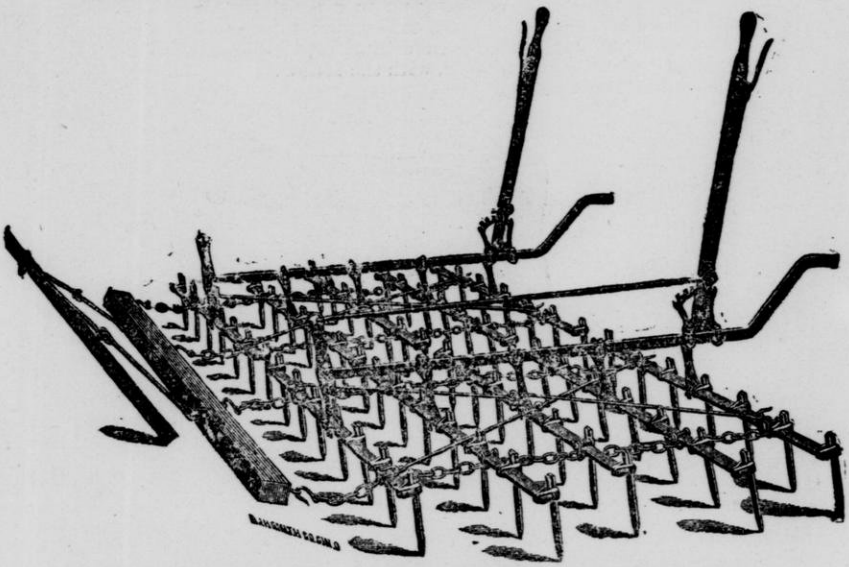
The Celebrated Boss Harrows.

OUR HARROWS ARE ALL FILLED WITH OUR CELEBRATED DAGGER-POINTED STEEL TEETH.



THE WOOD AND STEEL ADJUSTABLE HARROWS ARE MADE IN TWO OR THREE SECTIONS FOR TWO OR THREE HORSES.

THE ADJUSTABLE BOSS HARROW IN WOOD.



THE ADJUSTABLE BOSS HARROW IN STEEL.

CONCEDED BY ALL TO BE THE BEST HARROW IN THE WORLD.

THESE HARROWS ARE VERY CONVENIENT AND EASY TO OPERATE, AND GIVE THE BEST OF SATISFACTION.

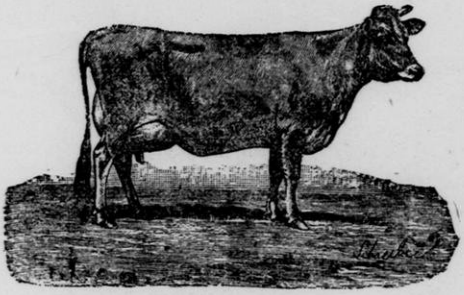
Write for price and ertms to **THE BOSS HARROW M'F'G CO., Madison Wis.**

The Lakeside Herd

—OF—

REGISTERED JERSEYS

Has been bred for butter exclusively, and in a short time will not contain any but tested cows and their produce not old enough to be tested. It has representatives of different noted animals in herd tracing to Alphea 171; Rajah 340; Omro 1247; St. Helier 45; St. Pogis 3d 2238, with the following tested cows: (See Butter tests of Jersey Cows, Vol. II.)



Quachette 17091, tested 2 years 10 months old, on dry food, with 19 lbs. 11½ oz. butter, salted 1 oz. to the pound and ready for market, in a week. On grass alone, one year later, 17 lbs. 13½ oz. butter.

Moonah's Pet 7484, tested on dry food, 15 lbs. 6 oz. butter in a week.

Ruby Love 16915, tested on dry food, 14 lbs. 12 oz. butter in a week.

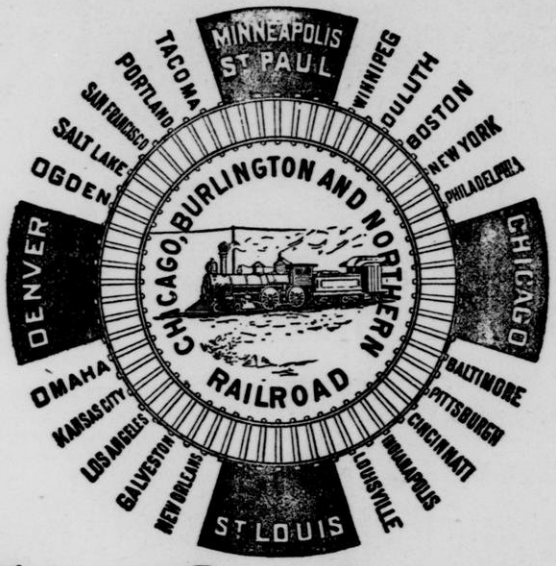
Ruby Love 2d 32038, tested on dry food, 14 lbs. 1 oz. butter in a week, and 28 lbs. 5½ oz. butter in two weeks, before 2 years old.

Bianca Lass 14997, test 14 lbs. 3½ oz. butter on grass alone.

These tests have all been made without any extra preparation and under supervision of the proprietor.

Come and See the Herd.

V. LOWE, Palmyra, Wis.



"The Burlington."

THE VESTIBULED LINE TO

ALL POINTS NORTH, EAST SOUTH AND WEST.

THE

CHICAGO, BURLINGTON & NORTHERN R. R.,

AND CONNECTING LINES OF THE

"GREAT BURLINGTON ROUTE,"

Offers to the traveling public the most expeditious and comfortable means of reaching

Chicago, St. Paul, Minneapolis, St. Louis, Peoria, Kansas City, St. Joseph, Omaha, Lincoln, Denver and Cheyenne,

From all the Principal Places in Wisconsin and Minnesota.

Its road bed is unexcelled, the grades are light, enabling fast time to be made, and the equipment is of the very best.

Starting from Minneapolis and St. Paul, its line runs along the east bank of the Mississippi to Savanna, Ills., whence one branch diverges east to Chicago, the other south to Fulton, Ills., connecting with the Chicago, Burlington & Quincy R. R. Through coaches and Pullman sleeping cars to Chicago and St. Louis without change. Pullman parlor cars on day trains between St. Paul, Minneapolis and Chicago. Peerless dining cars on Limited trains, furnishing an unapproachable cuisine at moderate prices. For tickets, information, etc., apply to any railroad ticket agent, or address,

GEO. B. HARRIS, *Vice President.* — *St. Paul, Minnesota.* — **W. J. C. KENYON,** *Gen. Pass. Agent.*

☞ *Mention "Farmers' Institute Bulletin" when writing to Advertisers.*

DR. VALERIUS & CO.,

WATERTOWN, WISCONSIN,

(44 miles west of Milwaukee.)

THE LARGEST
EXPORTING
AND
IMPORTING
ESTABLISHMENT
IN
AMERICA.

ESTABLISHED, 1872.

CLYDESDALE,
ENGLISH SHIRE,
PERCHERON-NORMAN
STALLIONS
AND
MARES.

Shetland Ponies.

WE Export and Import, making our trips pay each way. Consequently, our prices are lower than all other Importers. Every animal registered in their respective stud book. A certificate of registration with each horse, and every animal warranted a sure breeder.

TERMS TO SUIT CUSTOMERS.

WRITE FOR PARTICULARS.

DR. VALERIUS & CO.,

Stables near N. W. Depot. WATERTOWN, WIS.

☞ *Mention "Farmers' Institute Bulletin" when writing to Advertisers.*

A Pound of Beef (Fat Steer), 5c.

If a pound of butter can be produced from the same feed as a pound of beef, why do we hear so much about a "general purpose cow?"

The market is always good for first-class butter. Cows for beef are quoted low. A good Jersey cow will yield 500 pounds of butter in a year; suppose we say 400 pounds; it is worth and will bring 25c. per pound; that's $100; you will have the skimmed milk and a calf beside, or combined say you have a calf left, worth something, surely. If the calf is a heifer she will be a cow before your steer that you are raising for beef will be fit to sell. If the calf is a male he will probably bring at one year old almost if not quite as much as your common steer will at three years.

Why do not more people realize that the profit is in the cream—in the dairy—and let the general purpose cow go to the man that "wants the earth."

A Pound of Beef (Old Cow), 2c.

We in Wisconsin cannot compete with those people in the southwest in raising beef, but we can in producing butter, and most people are willing to concede that the Jersey cow is *the* cow for butter. Why, just figure it up. You will find that you can make more in devoting your energies to producing butter from a herd of Jersey cows, even by killing the male calves when born and letting the cow die of old age, than to raise beef alone, or in working in a general purpose way.

There is a beautiful herd of Jerseys at the Maples Farm, at the eastern city limits of Madison. It would do you good to see them, and the owners (C. B. Miller & Co., Madison, Wis.,) would be glad to have you look them over, whether you are seeking to purchase or not. While we "take no stock" in the "color" nonsense, as we all know that a cow with a white spot on will yield in the pail and butter tub as rich a reward to her owner as one without, still it is pleasant to say, in view of the late fashions, that "solid color" predominates in this herd, and the cattle are good size, with fine large teats, something to take hold of, and you don't wish all the time that you could afford to let the calf suck. These cattle represent some of the richest strains of Jersey blood. Think about this Jersey matter, and if you are in Madison try and get out to see this herd.

A Pound of Jersey Butter 25c.

Take Your Choice

—OF—

Ensilage Corn.

The Stowell's Evergreen Sweet Fodder Corn.

We place this sort at the head of the list this year because we believe it to be the most profitable for the farmer. It is much ahead of the other sorts named in quality and feeding value. With good soil and fair cultivation the stalk grows to a good height. A great argument in its favor is that the ear matures, as every one knows, and is of great value. Nearly all the so-called Evergreen Corn introduced into the State heretofore has been spurious and always of a short growth, but where parties have received the genuine Stowell's Evergreen, they have always expressed their complete satisfaction, and will take no other.

The "Sheeptooth" Fodder Corn

FOR GREEN FODDER OR ENSILAGE.

The demand last season for this variety was more than we could supply. Being earlier than the "B. & W.," it is more popular. Great care has been taken in the selection of this corn. We believe it to be far superior to the "B. & W.," as it ears well.

The "A. L." Southern Ensilage Seed Corn.

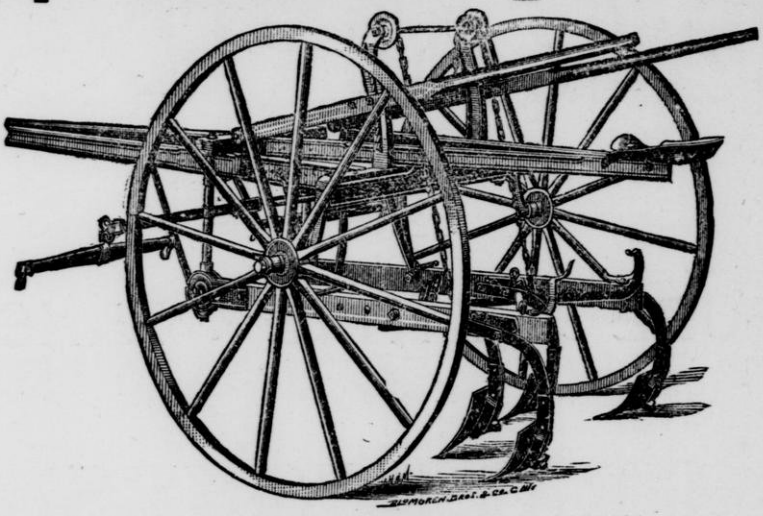
This does not differ from the "B. & W." corn. In our trial garden, where the two varieties were grown side by side, no difference could be noticed. From 30 to 40 tons can be grown per acre. An acre is equal to six acres of meadow hay.

Recleaned and Hand-Sorted Seed Corn.

This season all our corn will be recleaned, and imperfect and decayed kernals removed, so as to insure seed that will germinate perfectly. Only the cost of this operation will be added to the prices. Farmers who suffered this season from poor seed will appreciate this departure. There is no reason why seed corn should not be as carefully prepared as all other seed grain. Being in the seed business, we have the necessary equipment to enable us to do this at slight expense. For prices and additional information address

THE ALBERT LANDRETH SEED CO.,
MANITOWOC, WISCONSIN.

Improved Bonanza Riding Cultivator



ADVANTAGES:

The axle is made adjustable for cultivating in wide or narrow rows.

Axle is *very high* so that it will not break down the corn. The draft is direct from axle, and is so attached that it can be raised up or down and whiffletrees fixed at any point that may be desired.

Drag bars are attached to standards so as to swing with the least possible friction. Beams and shovels are provided both with friction slip and break pin, to prevent any possible danger of breaking shovels. Shovels are extra hardened and will scour equal to anything that can be had. Shovels are attached so as to be adjustable in every way; can be given more curve or set straight; set to throw dirt to or from corn.

We furnish either foot lifts or springs. The hand levers are very convenient to the driver, and drag bars can be raised very easily. The seat is adjustable high or low, also forward and back, so as to balance the pole perfectly. Wheels are high, and are made with iron hubs and run on steel axles. The tires on wheels are bolted to felloes.

SURFACE CULTIVATING.

For 1889 our Cultivators will be provided with shovels *plated and sharpened at upper end* so that when corn is well grown and there is danger of destroying roots by using pointed end of shovel and working deep in ground, the shovel may be reversed and the broad end of same worked in ground, which will destroy all weeds and grass, but will not go deep enough to destroy roots of corn. Few farmers fully realize the damage done to corn by deep cultivating after it is well-grown and roots are much spread. Deep cultivating should be done while corn is small and before roots have spread.

Bonanza Steel Cultivators.

For 1889 we will have the above Cultivator with Steel Beams, Seat Braces and Wheels. This Cultivator will be made so it can be had with 4 shovels, 6 shovels or 8 shovels, as desired. Only short beams and shovels need be added to change it from the 4 shovel.

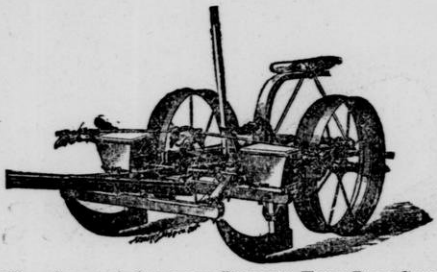
OTHER CULTIVATORS.

We also manufacture a full line of two-horse Walking Cultivators, Steel Frame, 5 Tooth, Three Shovel, Double Shovel, and Tobacco Cultivators, all of the best and most improved patterns. Send for catalogue.

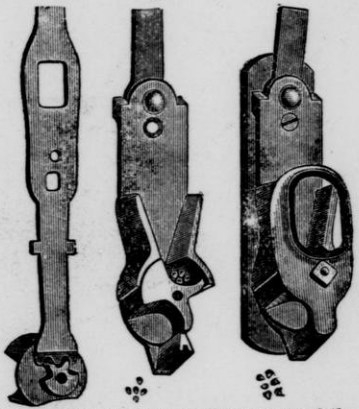
FULLER & JOHNSON M'FG CO., Madison, Wis.

BONANZA FORCE DROP

Corn Planter and Check Rower.



The above cut shows our Bonanza Force Drop Corn Planter with our Improved Check Rower.



Above cuts show the working parts of the Force Drop. Cut at left shows the manner in which the lever causes the seed cup to revolve, and throw the corn to place. The center cut shows the seed cup in position with corn in cup, and also hill of corn that has just been dropped. The cut at the right shows the whole seed cup and lever, and also hill of corn just dropped.

SPECIAL POINTS.

FORCE DROP! IRON JOINTS!

METAL WHEELS!

IRON SEED BOXES!

CENTER LOCK LEVER!

Runners can either be locked in the ground or depth regulated by the Driver's feet.

It forcibly *throws* the corn so that it drops to the ground *instantly* when the lever is thrown, so that it makes no difference whether team is driven fast or slow, or by jerks.

Will plant corn in straight rows both ways, whether team goes fast or slow. This alone will save the price of Planter for every 100 acres planted, by not having corn destroyed by cultivating.

When raised out of the ground it is self-locking, thus avoiding the use of latches.

It has glass at the heel of the drop so that the driver can at all times see the corn dropping.

CHECK ROWER.

SPECIAL POINTS.

Made Entirely of Iron and Steel. No Wood Frame Across Planter. Great Strength. Easy Movement. Only Three Working Parts in Center of Check Rower.

Made adjustable for either our 3 ft. 6 or 3 ft. 8 Planter.

Driver can throw off the wire at end of field without leaving his seat, by pulling the string attached to latch and hand lever. (See cut.)

This Check Rower is of the very latest improvement, is adapted especially to our Force Drop Planter, and the two together make the very best outfit for planting corn to be found in the market. We defy anyone to produce its equal.

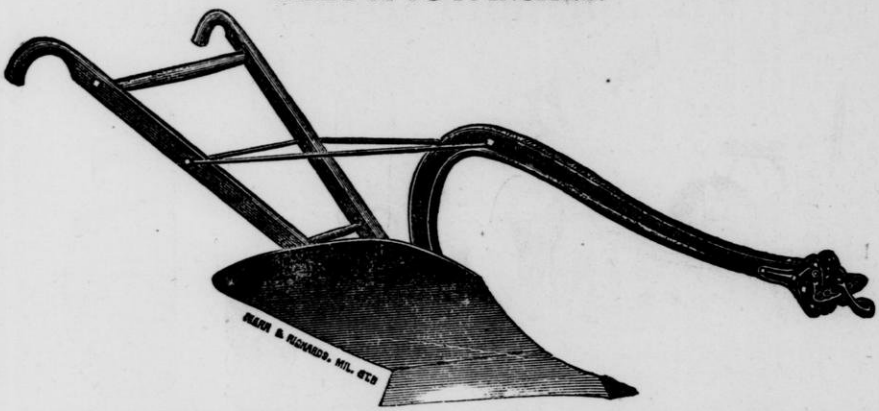
ENSILAGE ATTACHMENT.

A Drill or Ensilage Attachment makes it a perfect machine for planting Ensilage Corn. Two rows are planted at a time. The corn can be dropped one kernel in a place and any distance apart that is required. It was used with the best results the past season.

FULLER & JOHNSON M'F'G CO., MADISON, WIS.

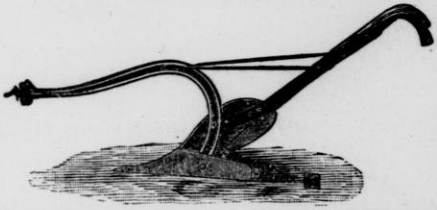
SCOTLANDER
Steel Beam Turf and Stubble Plow.

SIZES 12 TO 16 INCHES.



The SCOTLANDER is a general purpose or Turf and Stubble Plow. It is made with long sloping mould board, works well in turning over clover, at same time is a good stubble plow. We believe them to be the very best plow that can be had where a general purpose plow is wanted. It is made with both wood beam and steel beam.

This Plow is Made With the Patented Reversible Heel.



Patent Reversible Heel for Landside of Plows.

This cut represents our Heel Plate for landside, and the manner of attaching the same to plow.

We put this Heel Plate on all our old ground stubble plows.

The Heel Plate forms a part of landside, and is made fast with one bolt, when the lower side becomes worn the plate can be turned around to bring the thick side down, thereby making it last more than double as long as plows made in the old way.

Farmers should insist upon having their dealers furnish them with plows made with our Patented Reversible Heel on Landside.

IMPROVEMENTS FOR 1889.

We have recently invented and adopted a new and very valuable way for constructing the Mould Board of Plows. In place of using the "soft center" steel or the "soft back" steel as heretofore, and as is used by all other manufacturers of plows. We use a solid Hardened Steel Mould Board and to strengthen it we surround the outer edge of back with a band of soft steel or iron, which gives it great strength and at the same time gives the *full thickness* of the mould board hardened, which makes the wearing qualities of plows made in this way from

One-Third to Two-Thirds Greater

than when made of the "soft center" or "soft back" steel. All farmers will readily see the advantage of this style plow and will not buy plows made the old way when this can be had.

We have patents covering the improvement, and plows made in this way can only be obtained from us or our agents. ☞ **Send for our Catalogue.**

FULLER & JOHNSON M'F'G CO.,

Madison, Wisconsin.

GLENDALE HERD

OF THOROUGHBRED

SHORT-HORN CATTLE,

ESTABLISHED IN 1871.

LARGEST AND OLDEST HERD IN THE STATE.

Being crowded for winter quarters, we are compelled to reduce our herd, and in order to do this we have reduced our prices to bed rock. We also make the following offer, good until December 1st, 1888:

We will Pay the Freight

On all animals unnder TWELVE MONTHS OLD, to any point in WISCONSIN, located on the Wisconsin Central, C. & N. W., Lake Shore & Western, or C., M. & St. P. Railroads. This will give breeders and farmers an excellent opportunity to obtain animals of superior breeding and rare individual merit (many of them being show winners), at a low figure.

STILSON BROS.,

Oshkosh, Wis.

PREMIUM HERD,

Aberdeen-Angus Cattle,

—AT THE—

WISCONSIN STATE FAIR.

ALL OF THE HIGHEST BRED AND MOST NOTED PRIZE-WINNING FAMILIES REPRESENTED.

Special attention invited to the record of stock from this herd at leading fairs.

Personal inspection invited. Correspondence cheerfully answered.

LESLIE & BURWELL,

Cottage Grove, Wis.